

Table C.2-4. Emission factors used for criteria and toxic air pollutants from fuel oil combustion.

Criteria pollutants and carbon dioxide	Emission factor (pounds/1,000 gallons) ^a	Emission factor (pounds/1,000 gallons) ^b	Organic compounds	Emission factor (pounds/1,000 gallons) ^c	Metals	Emission factor (pounds/1,000 gallons) ^d
	Steam generation	Diesel engines		Steam generation and diesel engines		Steam generation and diesel engines
Sulfur dioxide ^e	71	73	Benzene	2.4×10^{-4}	Antimony	5.3×10^{-3}
Particulate matter	2.0	27	Ethylbenzene	6.4×10^{-5}	Arsenic	1.3×10^{-3}
Carbon monoxide	5.0	470	Formaldehyde	0.030	Barium	2.5×10^{-3}
Nitrogen dioxide	20	400	Naphthalene	1.1×10^{-3}	Beryllium	2.8×10^{-5}
Total organic compounds	0.25	85	1,1,1-Trichloroethane	2.4×10^{-4}	Cadmium	4.0×10^{-4}
Carbon dioxide	2.2×10^4	2.3×10^4	(methyl chloroform)			
			Toluene	6.2×10^{-3}	Chloride	0.35
			o-Xylene	1.1×10^{-4}	Chromium (total)	8.5×10^{-4}
			Acenaphthene	2.1×10^{-5}	Chromium (hexavalent)	2.5×10^{-4}
			Acenaphthylene	2.5×10^{-7}	Cobalt	6.0×10^{-3}
			Anthracene	1.2×10^{-6}	Copper	1.8×10^{-3}
			Benz(a)anthracene	4.0×10^{-6}	Fluoride	0.037
			Benzo(b,k)fluoranthene	1.5×10^{-6}	Lead	1.5×10^{-3}
			Benzo(g,h,i)perylene	2.3×10^{-6}	Manganese	3.0×10^{-3}
			Chrysene	2.4×10^{-6}	Mercury	1.1×10^{-4}
			Dibenzo(a,h)anthracene	1.7×10^{-6}	Molybdenum	7.9×10^{-4}
			Fluoranthene	4.8×10^{-6}	Nickel	0.085
			Fluorene	4.5×10^{-6}	Phosphorus	9.5×10^{-3}
			Indeno(1,2,3-cd)pyrene	2.1×10^{-6}	Selenium	6.8×10^{-4}
			Phenanthrene	1.1×10^{-5}	Vanadium	0.0318
			Pyrene	4.3×10^{-6}	Zinc	0.0291
			Chlorinated dibenzo-p-dioxins	3.1×10^{-9}		

a. Source: Tables 1.3-1, 1.3-3, and 1.3-12 of EPA (1998).

b. Source: Project Data Sheets (Appendix C.6).

c. Source: Table 1.3-8 of EPA (1998).

d. Source: Table 1.3-10 of EPA (1998).

e. Assumes 0.5 percent sulfur content of fuel.

Table C.2-5. Stack parameters for facilities associated with waste processing alternatives.

Project/Process	Stack identifier	Assumed source locations UTM coordinates ^a (meters)		Elevation (meters)	Stack height (feet)	Stack diameter (feet)	Exhaust temperature (°Celcius)	Volumetric flow rate (actual cubic feet per minute)	Exit velocity (feet per minute)
Proposed facilities									
Full Separations Stack	P9A	344,035	4,826,100	1,498	130	9.50	38	166,180	2,344
Vitrification Facility Stack	P9B	344,035	4,826,100	1,498	108	10.0	38	191,467	2,438
LAWT Facility Stack	P9C	344,035	4,826,100	1,498	152	5.00	38	49,639	2,528
Transuranic Separations Stack	P49A	344,035	4,826,100	1,498	130	9.50	38	166,180	2,344
Transuranic/C LAWT Stack	P49C	344,035	4,826,100	1,498	152	5.00	38	49,639	2,528
HIP Facility Stack	P71	344,022	4,825,697	1,498	108	10.0	38	172,000	2,190
Direct Cement Facility Stack	P80	344,035	4,826,954	1,498	243	10.0	38	262,000	3,336
Early Vitrification Facility Stack	P88	344,035	4,826,954	1,498	108	10.0	38	205,407	2,615
Cs Ion Exchange Stack	P111	344,035	4,826,100	1,498	152	5.00	38	49,639	2,528
Alternate SBW Treatment Stack	P115	344,022	4,825,697	1,498	130	9.50	38	126,000	2,385
Other INTEC facilities									
INTEC main stack ^b	708-001	343,924	4,825,948	1,498	250	6.50	33	100,000	3,014
Coal-Fired Steam Generating Facility	787-001	344,120	4,825,445	1,499	150	5.83	177	74,863	2,801
Powerhouse ^c	606-Comp.	343,800	4,826,089	1,498	68	2.0	232	6,010	1,913

a. UTM coordinate system.

b. The INTEC main stack would be the release point for emissions from the following existing INTEC facilities: New Waste Calcining Facility, Process Equipment Waste Evaporator, Liquid Effluent Treatment and Disposal Facility, Tank Farm, and some of the calcine bin sets.

c. Used as a surrogate for future diesel-fuel burning equipment that could replace or supplement existing steam facilities to meet HLW processing steam demand. Stack parameters are patterned after stacks from existing fuel-burning equipment at this location.

Cs = cesium; HIP = Hot Isostatic Press; LAWT = low-activity waste treatment; TRU = transuranic; UTM = Universal Transverse Mercator.

Table C.2-7. Population distribution within 50 miles of INTEC.^a

Distance (miles)										Sector total	Direction
0-1	1-2	2-3	3-4	4-5	5-10	10-20	20-30	30-40	40-50		
0	0	0	0	0	0	6	22	350	2,394	2,772	S
0	0	0	0	0	0	0	0	0	29	29	SSW
0	0	0	0	0	0	0	2	0	0	2	SW
0	0	0	0	0	0	3	6	6	97	112	WSW
0	0	0	0	0	0	157	45	10	22	234	W
0	0	0	0	0	0	1,049	914	45	4	2,012	WNW
0	0	0	0	0	0	3	167	317	648	1,135	NW
0	0	0	0	0	0	52	32	11	10	105	NNW
0	0	0	0	0	0	113	46	15	6	180	N
0	0	0	0	0	0	0	0	199	38	237	NNE
0	0	0	0	0	0	0	403	663	196	1,262	NE
0	0	0	0	0	0	0	43	495	2,079	2,617	ENE
0	0	0	0	0	0	0	1	674	66,430	67,105	E
0	0	0	0	0	0	0	26	514	11,473	12,013	ESE
0	0	0	0	0	0	10	413	15,169	4,786	20,378	SE
0	0	0	0	0	0	30	135	1,528	6,758	8,451	SSE
0	0	0	0	0	0	1,423	2,255	19,996	94,970	118,664	Population total

a. Based on 1990 Census; centered on Universal Transverse Mercator (UTM) Coordinates 343,924 meters East; 4,825,948 meters North. Values are number of people residing within sector of specified distance and direction.

Table C.2-9. Radionuclide emission rates (curies per year) for projects associated with waste processing alternatives.^a

Project identifier	P1A	P1B	P1C	P1D	P9A/P23A	P9B/P23B	P9C/P23C	P26	P26	P26	P18	P18MC	P35D or E
Radionuclide	Calcine SBW with MACT	NGLW & Heel Waste Mgmt.	PEW Evap. and LET&D	No Action Alt.	Full Seps.	Vit. Plant	Class A Grout Plant	Tank Farm Closure	Bin sets Closure	Fill with Class A Grout	New Anal. Lab.	Remote Anal. Lab. Operation	Class A Grout Packaging
Americium-241	-	-	-	-	-	-	-	7.9×10^{-12}	1.6×10^{-8}	4.1×10^{-12}	-	-	-
Cobalt-60	1.1×10^{-6}	1.3×10^{-7}	1.3×10^{-7}	1.3×10^{-7}	-	-	2.8×10^{-8}	5.4×10^{-11}	-	2.8×10^{-11}	-	-	-
Cesium-134	6.2×10^{-6}	8.2×10^{-8}	8.2×10^{-8}	8.2×10^{-8}	-	2.9×10^{-10}	-	1.6×10^{-9}	-	8.6×10^{-10}	-	-	-
Cesium-137	2.4×10^{-3}	2.4×10^{-4}	2.4×10^{-4}	2.4×10^{-4}	2.9×10^{-5}	1.2×10^{-7}	-	5.6×10^{-8}	8.6×10^{-6}	3.0×10^{-8}	5.1×10^{-8}	2.6×10^{-8}	4.5×10^{-9}
Europium-154	9.5×10^{-7}	2.0×10^{-7}	2.0×10^{-7}	2.0×10^{-7}	-	4.5×10^{-11}	-	5.1×10^{-10}	-	2.7×10^{-10}	-	-	-
Europium-155	-	-	-	-	-	-	-	2.4×10^{-10}	-	1.3×10^{-10}	-	-	-
Hydrogen-3 (tritium)	23	-	9.0	9.0	-	-	45	7.5×10^{-11}	-	4.0×10^{-11}	-	-	-
Iodine-129	0.06	0.03	0.03	0.03	7.5×10^{-7}	-	2.0×10^{-3}	5.0×10^{-13}	-	2.6×10^{-13}	-	-	-
Nickel-63	-	-	-	-	-	-	-	3.3×10^{-12}	-	1.8×10^{-12}	-	-	-
Promethium-147	-	-	-	-	-	-	-	-	-	-	-	-	-
Plutonium-238	5.0×10^{-6}	6.2×10^{-6}	6.2×10^{-6}	6.2×10^{-6}	-	2.4×10^{-10}	-	1.4×10^{-10}	1.4×10^{-7}	7.3×10^{-11}	-	-	-
Plutonium-239	5.7×10^{-7}	1.0×10^{-7}	1.0×10^{-7}	1.0×10^{-7}	-	2.7×10^{-11}	-	9.8×10^{-11}	-	5.2×10^{-11}	1.3×10^{-11}	6.4×10^{-12}	1.1×10^{-12}
Plutonium-241	-	-	-	-	-	-	-	7.7×10^{-11}	5.5×10^{-8}	4.0×10^{-11}	-	-	-
Ruthenium-106	6.3×10^{-5}	2.4×10^{-6}	2.4×10^{-6}	2.4×10^{-6}	-	-	1.6×10^{-6}	4.7×10^{-10}	-	2.5×10^{-10}	-	-	-
Antimony-125	1.0×10^{-5}	1.5×10^{-6}	1.5×10^{-6}	1.5×10^{-6}	4.8×10^{-7}	-	2.7×10^{-7}	1.1×10^{-10}	-	5.7×10^{-11}	-	-	-
Samarium-151	-	-	-	-	-	-	-	-	2.0×10^{-7}	-	-	-	-
Strontium-90 ^b	3.1×10^{-4}	2.0×10^{-5}	2.0×10^{-5}	2.0×10^{-5}	2.1×10^{-9}	1.5×10^{-8}	-	5.1×10^{-8}	1.1×10^{-5}	2.7×10^{-8}	4.5×10^{-7}	2.2×10^{-7}	3.9×10^{-8}
Technetium-99	-	-	-	-	-	1.8×10^{-5}	-	-	1.3×10^{-12}	3.0×10^{-9}	6.9×10^{-13}	-	-

Table C.2-9. (continued).

Project identifier	P49A	P49C	P49D	P51	P51	P51	P59A	P71	P80	P88	P111	P117	P133
Radionuclide	TRU/ Class C Seps.	Class C Grout Plant	Class C Grout Packaging	Tank Farm Closure	Bin sets Closure	Fill with Class A Grout	Calcine Retrieval/ Transport	HIP Waste Treat.	Direct Cement. Treat.	Early Vit.	Treat SBW/NGLW with Cs IX	Calcine/ Resin Packaging	Waste Treatment Pilot Plant
Americium-241	-	-	-	7.9×10^{-12}	1.6×10^{-8}	4.1×10^{-12}	-	-	-	-	2.0×10^{-5}	-	-
Cobalt-60	-	8.1×10^{-9}	-	5.4×10^{-11}	-	2.8×10^{-11}	-	-	-	2.1×10^{-9}	9.8×10^{-6}	-	-
Cesium-134	-	4.5×10^{-8}	-	1.6×10^{-9}	-	8.6×10^{-10}	-	-	-	1.2×10^{-8}	2.1×10^{-8}	-	-
Cesium-137	2.9×10^{-5}	1.8×10^{-5}	4.5×10^{-9}	5.6×10^{-8}	8.6×10^{-6}	3.0×10^{-8}	2.0×10^{-3}	0.09	7.8×10^{-8}	4.7×10^{-6}	2.0×10^{-6}	8.6×10^{-6}	2.9×10^{-9}
Europium-154	-	-	-	5.1×10^{-10}	-	2.7×10^{-10}	-	-	-	1.8×10^{-9}	9.9×10^{-6}	-	-
Europium-155	-	-	-	2.4×10^{-10}	-	1.3×10^{-10}	-	-	-	-	-	-	-
Hydrogen-3 (tritium)	-	45	-	7.5×10^{-11}	-	4.0×10^{-11}	-	-	-	45	45	-	-
Iodine-129	7.5×10^{-7}	4.2×10^{-4}	-	5.0×10^{-13}	-	2.6×10^{-13}	-	-	-	1.0×10^{-3}	1.3×10^{-7}	-	-
Nickel-63	-	-	-	3.3×10^{-12}	-	1.8×10^{-12}	-	-	-	-	-	-	-
Promethium-147	-	-	-	-	-	-	-	-	-	-	5.2×10^{-5}	-	-
Plutonium-238	-	-	-	1.4×10^{-10}	1.4×10^{-7}	7.3×10^{-11}	3.2×10^{-5}	-	-	9.5×10^{-9}	5.2×10^{-5}	1.2×10^{-7}	-
Plutonium-239	-	-	1.1×10^{-12}	9.8×10^{-11}	-	5.2×10^{-11}	-	-	2.0×10^{-11}	1.1×10^{-9}	3.1×10^{-6}	-	7.3×10^{-13}
Plutonium-241	-	-	-	7.7×10^{-11}	5.5×10^{-8}	4.0×10^{-11}	-	-	-	-	-	-	-
Ruthenium-106	-	4.6×10^{-7}	-	4.7×10^{-10}	-	2.5×10^{-10}	-	1.1×10^{-5}	-	1.2×10^{-7}	-	-	-
Antimony-125	4.8×10^{-7}	7.5×10^{-8}	-	1.1×10^{-10}	-	5.7×10^{-11}	-	8.2×10^{-8}	-	2.0×10^{-8}	3.8×10^{-6}	-	-
Samarium-151	-	-	-	-	-	2.0×10^{-7}	-	-	-	-	2.8×10^{-5}	-	-
Strontium-90 ^b	2.1×10^{-9}	2.3×10^{-6}	3.9×10^{-8}	5.1×10^{-8}	1.1×10^{-5}	2.7×10^{-8}	6.0×10^{-3}	-	6.8×10^{-7}	6.0×10^{-7}	1.6×10^{-3}	2.3×10^{-5}	2.5×10^{-8}
Technetium-99	1.8×10^{-5}	-	-	1.3×10^{-12}	3.0×10^{-9}	6.9×10^{-13}	-	1.7×10^{-4}	-	-	8.0×10^{-7}	-	-

a. See Section 3.1 for listing of project names. Source: Project Data Summaries in Appendix C.6 and backup documentation.

b. An equal amount of Yttrium-90 would also be present.

LET&D = Liquid Effluent Treatment and Disposal Facility; MACT = maximum achievable control technology; NGLW = newly-generated liquid waste; PEW = process equipment waste; TRU = transuranic.

Table C.2-10. Summary of radiation dose impacts associated with airborne radionuclide emissions from waste processing alternatives.

Case ^a (units)	Applicable Standard	No Action Alternative	Continued Current Operations Alternative	Separations Alternative			Non-Separations Alternative			Minimum INEEL Processing Alternative at INEEL
				Full Separations Option	Planning Basis Option	Transuranic Separations Option	Hot Isostatic Pressed Waste Option	Direct Cement Waste Option	Early Vitrification Option	
Dose to maximally-exposed offsite individual (millirem per year)	10 ^b	6.0×10 ⁻⁴	1.7×10 ⁻³	1.2×10 ⁻⁴	1.8×10 ⁻³	6.0×10 ⁻⁵	1.8×10 ⁻³	1.7×10 ⁻³	8.9×10 ⁻⁴	9.5×10 ⁻⁴
Controlling organ		Thyroid	Thyroid	Thyroid	Thyroid	Thyroid	Thyroid	Thyroid	Thyroid	Thyroid
Controlling pathway		Ingestion	Ingestion	Ingestion	Ingestion	Ingestion	Ingestion	Ingestion	Ingestion	Ingestion
Controlling radionuclide		I-129	I-129	I-129	I-129	H-3	I-129	I-129	I-129	I-129
Dose to maximally-exposed noninvolved worker (millirem per year) ^c	5,000 ^d	7.0×10 ⁻⁶	1.8×10 ⁻⁵	4.4×10 ⁻⁵	9.0×10 ⁻⁵	3.4×10 ⁻⁵	3.6×10 ⁻⁵	3.0×10 ⁻⁵	4.8×10 ⁻⁵	1.0×10 ⁻⁴
Controlling organ		Thyroid	Thyroid	Bone surface	Thyroid	Bone surface	Thyroid	Thyroid	Bone surface	Bone surface
Controlling pathway		Inhalation	Inhalation	Inhalation	Inhalation	Inhalation	Inhalation	Inhalation	Inhalation	Inhalation
Controlling radionuclide		I-129	I-129	Pu-238	Pu-238	Pu-238	Pu-238	Pu-238	Pu-238	Pu-238
Collective dose to population within 80 kilometers of INTEC (person-rem per year) ^{e,f}	N.A.	0.032	0.094	5.6×10 ⁻³	0.095	3.1×10 ⁻³	0.097	0.095	0.048	0.048

- a. Doses are maximum values over any single year during which waste processing occurs; annual doses from waste stored on an interim basis after waste processing is completed would be much less.
- b. EPA dose limit specified in 40 CFR 61.92; applies to effective dose equivalent from air releases only.
- c. Location of highest INEEL onsite dose is Central Facilities Area.
- d. Occupational dose limit per 10 CFR 835.202; applies to sum of doses from all exposure pathways.
- e. A reference population of 200,000 people is used for future population dose estimates. At currently projected growth rates, this is the approximate population level that would exist around the year 2030. During 1990, this population was 118,644.
- f. Controlling organ, pathway, and radionuclide are the same as for the maximally-exposed offsite individual.

Table C.2-11. Summary of annual average non-radiological emissions associated with fuel combustion.^a

Alternative and project	Description	Years	Category totals			Criteria pollutants					
			Units	Criteria (ton/year)	Toxic (lbs/year)	Carbon dioxide ^b (ton/year)	Sulfur dioxide (ton/year)	Respirable particulates (ton/year)	Carbon monoxide (ton/year)	Oxides of nitrogen (ton/year)	Volatile organic compounds (ton/year)
No Action											
P1D	No Action Alternative	17	24	290	5.2×10^3	17	0.48	1.2	4.8	0.061	0.73
P1E	Bin Set 1 Calcine Transfer	1	5.9	73	1.3×10^3	4.3	0.12	0.3	1.2	0.015	0.18
P18MC	Remote Analytical Lab - Minimum Compliance	29	1.9	22	390	1.3	0.04	0.16	0.42	0.017	0.055
Totals			32	390	6.9×10^3	23	0.64	1.7	6.4	0.093	0.96
Continued Current Operations Alternative											
P1A	Calcine SBW incl. NWCF (MACT) Upgrades	6	33	290	5.2×10^3	17	0.73	5.8	8.6	0.9	0.73
P1B	NGLWM and TF Waste Heel Waste	21	19	230	4.1×10^3	14	0.38	1.0	3.9	0.056	0.58
P1E	Bin Set 1 Calcine Transfer	1	5.9	73	1.3×10^3	4.3	0.12	0.3	1.2	0.015	0.18
P18MC	Remote Analytical Lab - Minimum Compliance	29	1.9	22	390	1.3	0.04	0.16	0.42	0.017	0.055
Totals			60	620	1.1×10^4	36	1.3	7.3	14	0.98	1.5
Full Separations Option											
P59A	Calcine Retrieval and Transport	21	6	73	1.3×10^3	4.3	0.12	0.30	1.2	0.015	0.18
P9A	Full (early) Separations	21	180	2.1×10^3	3.7×10^4	120	3.8	14	39	1.5	5.2
P9B	Vitrification Plant	20	14	140	2.5×10^3	8.1	0.29	1.7	3.2	0.23	0.34
P9C	Class A Grout Plant	21	13	130	2.4×10^3	7.8	0.28	1.7	3.1	0.23	0.33
P24	Vitrified Product Interim Storage	47	- ^c	-	-	-	-	-	-	-	-
P18	New Analytical Lab - Full Separations	26	2.5	27	480	1.6	0.051	0.24	0.55	0.03	0.067
P118	Separations Organic Incinerator Project	21	0.047	0.053	1.0	3.3×10^{-3}	1.2×10^{-3}	0.021	0.018	3.7×10^{-3}	1.3×10^{-4}
P133	Waste Pilot Facility - Full Separations	27	2.2	27	480	1.6	0.046	0.13	0.46	0.01	0.067
and P35D	Class A Grout Packaging and Shipping to INEEL Landfill	21	0.11	0.13	2.4	7.8×10^{-3}	2.8×10^{-3}	0.049	0.042	8.8×10^{-3}	3.1×10^{-4}
P27	Class A/C Grout in New Landfill Facility	21	4.7	5.3	100	0.33	0.12	2.1	1.8	0.37	0.013
or P35E	Class A Grout Packaging and Loading for Offsite Disposal	21	0.11	0.13	2.4	7.8×10^{-3}	2.8×10^{-3}	0.049	0.042	8.8×10^{-3}	3.1×10^{-4}
Totals			220	2.5×10^3	4.4×10^4	150	4.7	21	50	2.4	6.2

C.2.37

DOE/EIS-0287D

Table C.2-11. Summary of annual average non-radiological emissions associated with fuel combustion (continued).

Alternative and project	Description	Years	Category totals			Criteria pollutants					
			Units	Criteria (ton/year)	Toxic (lbs/year)	Carbon dioxide ^b (ton/year)	Sulfur dioxide (ton/year)	Respirable particulates (ton/year)	Carbon monoxide (ton/year)	Oxides of nitrogen (ton/year)	Volatile organic compounds (ton/year)
Planning Basis Option											
P1A	Calcine SBW including NWCF Upgrades (MACT)	6	33	290	5.2×10^3	17	0.73	5.8	8.6	0.90	0.73
P1B	NGLWM and TF Waste Heel Waste	21	19	230	4.1×10^3	14	0.38	1.0	3.9	0.056	0.58
P59A	Calcine Retrieval and Transport – Planning Basis	16	5.9	73	1.3×10^3	4.3	0.12	0.30	1.2	0.015	0.18
P23A	Full Separations	16	180	2.1×10^3	3.7×10^4	120	3.8	14	39	1.5	5.2
P23B	Vitrification Plant	15	14	140	2.5×10^3	8.1	0.29	1.7	3.2	0.23	0.34
P23C	Class A Grout Plant	16	13	130	2.4×10^3	7.8	0.28	1.7	3.1	0.23	0.33
P24	Vitrified Product Interim Storage	47	-	-	-	-	-	-	-	-	-
P18	New Analytical Lab	21	2.5	27	480	1.6	0.051	0.24	0.55	0.03	0.067
P118	Process Organic Incinerator – Planning Basis	16	0.047	0.053	1.0	3.3×10^{-3}	1.2×10^{-3}	0.021	0.018	4.0×10^{-3}	1.3×10^{-4}
P133	Waste Pilot Plant – Plan Basis	22	19	240	4.2×10^3	14	0.39	1.0	3.9	0.053	0.59
P35E	Class A Grout Packaging and Loading for Offsite Disposal (Planning Basis)	16	0.11	0.13	2.4	7.8×10^{-3}	2.8×10^{-3}	0.049	0.042	8.8×10^{-3}	3.1×10^{-4}
Totals				290	3.2×10^3	5.7×10^4	190	60	26	64	3.0
Transuranic Separations Option											
P59A	Calcine Retrieval and Transport	21	5.9	73	1.3×10^3	4.3	0.12	0.30	1.2	0.015	0.18
P49A	TRU-C Separations	21	88	980	1.8×10^4	58	1.8	8.1	20	0.93	2.5
P49C	Class C Grout Plant	21	13	130	2.4×10^3	7.8	0.28	1.7	3.1	0.23	0.33
P39A	Packaging and Loading TRU at INTEC for Shipment to WIPP	19	-	-	-	-	-	-	-	-	-
P18	New Analytical Lab – Full or TRU Separations	26	2.5	27	480	1.6	0.051	0.24	0.55	0.030	0.067
P118	Separations Organic Incinerator Project	21	.047	0.053	1.0	3.0×10^{-3}	1.2×10^{-3}	0.021	0.018	3.7×10^{-3}	1.3×10^{-4}
P133	Waste Pilot Facility – TRU Separations	27	10	120	2.1×10^3	6.9	0.20	0.51	2.0	0.029	0.29
and P49D	Class C Grout Packaging and Shipping to INEEL Landfill	21	0.11	0.13	2.4	2.8×10^{-3}	2.8×10^{-3}	0.049	0.042	8.8×10^{-3}	3.1×10^{-4}
P27	Class A/C Grout in New Landfill Facility	21	4.7	5.3	100	0.33	0.12	2.1	1.8	0.37	0.013
Totals				120	1.3×10^3	2.4×10^4	79	2.6	13	28	1.6
											3.3

Table C.2-11. Summary of annual average non-radiological emissions associated with fuel combustion (continued).

Alternative and project	Description	Category totals				Criteria pollutants					
		Years	Criteria	Toxic	Carbon dioxide ^b	Sulfur dioxide	Respirable particulates	Carbon monoxide	Oxides of nitrogen	Volatile organic compounds	Lead
			Units	(ton/year)	(lbs/year)	(ton/year)	(ton/year)	(ton/year)	(ton/year)	(ton/year)	(lbs/year)
Hot Isostatic Pressed Waste Option											
P1A	Calcine SBW incl. NWCF Upgrades (MACT)	6	33	290	5.2×10^3	17	0.73	5.8	8.6	0.90	0.73
P1B	NGLWM and TF Waste Heel Waste	21	19	230	4.1×10^3	14	0.38	1.0	3.9	0.056	0.58
P18	New Analytical Lab	21	2.5	27	480	1.6	0.051	0.24	0.55	0.03	0.067
P59A	Calcine Retrieval and Transport	21	5.9	73	1.3×10^3	4.3	0.12	0.3	1.2	0.015	0.18
P71	Mixing and HIPing	21	36	440	7.9×10^3	26	0.74	1.9	7.4	0.10	1.11
P72	HIPed HLW Interim Storage	54	-	-	-	-	-	-	-	-	-
P73A	Packaging and Loading HIPed Waste at INTEC for Shipment to NGR	20	-	-	-	-	-	-	-	-	-
P133	Waste Pilot Facility – HIP	27	0.052	0.059	1.1	3.7×10^{-3}	1.3×10^{-3}	0.023	0.02	4.1×10^{-3}	1.5×10^{-4}
Totals			97	1.1×10^3	1.9×10^4	63	2.0	9.3	22	1.1	2.7
Direct Cement Waste Option											
P1A	Calcine SBW including NWCF Upgrades (MACT)	6	33	290	5.2×10^3	17	0.73	5.8	8.6	0.9	0.73
P1B	NGLWM and TF Waste Heel Waste	21	19	230	4.1×10^3	14	0.38	1.0	3.9	0.056	0.58
P18	New Analytical Lab	21	2.5	27	480	1.6	0.051	0.24	0.55	0.03	0.067
P59A	Calcine Retrieval and Transport	21	5.9	73	1.3×10^3	4.3	0.12	0.30	1.2	0.015	0.18
P71	Mixing and HIPing	21	22	270	4.9×10^3	16	0.45	1.2	4.6	0.066	0.68
P81	Unseparated Cementitious HLW Interim Storage	54	-	-	-	-	-	-	-	-	-
P83A	Packaging & Loading of Cement Waste at INTEC for Shipment to NGR	20	-	-	-	-	-	-	-	-	-
P133	Waste Pilot Facility – Direct Cement	27	0.052	0.059	1.1	3.7×10^{-3}	1.3×10^{-3}	0.023	0.020	4.1×10^{-3}	1.5×10^{-4}
Totals			83	900	1.6×10^4	53	1.7	8.6	19	1.1	2.2
Early Vitrification Option											
P1C	PEW Evaporator and LET&D Operations	26	4.8	58	1.0×10^3	3.4	0.1	0.29	1.0	0.020	0.14
P18	New Analytical Lab	21	2.5	27	480	1.6	0.051	0.24	0.55	0.030	0.067
P59A	Calcine Retrieval and Transport	21	5.9	73	1.3×10^3	4.3	0.12	0.30	1.2	0.015	0.18
P61	Vitrified HLW Interim Storage	54	-	-	-	-	-	-	-	-	-
P62A	Packaging/Loading Vitrified HLW at INTEC for Shipment to NGR	20	-	-	-	-	-	-	-	-	-

C.2.39

DOE/EIS-0287D

Table C.2-11. Summary of annual average non-radiological emissions associated with fuel combustion (continued).

Alternative and project	Description	Years	Category totals			Criteria pollutants					
			Units	Criteria (ton/year)	Toxic (lbs/year)	Carbon dioxide ^b (ton/year)	Sulfur dioxide (ton/year)	Respirable particulates (ton/year)	Carbon monoxide (ton/year)	Oxides of nitrogen (ton/year)	Volatile organic compounds (ton/year)
Early Vitrification Option (continued)											
P88	Early Vitrification with MACT	21	27	330	5.9×10^3	19	0.54	1.4	5.4	0.069	0.82
P90A	Packaging & Loading Vitrified SBW at INTEC for Shipment to WIPP	18	-	-	-	-	-	-	-	-	-
P133	Waste Pilot Facility – Early Vitrification	27	0.052	0.059	1.1	3.7×10^{-3}	1.3×10^{-3}	0.023	0.02	4.1×10^{-3}	1.5×10^{-4}
Totals			40	490	8.7×10^3	29	0.82	2.2	8.2	0.14	1.2
Minimum INEEL Processing Alternative											
P1C	PEW Evaporator and LET&D Operations	26	4.8	58	1.0×10^3	3.4	0.10	0.29	1.0	0.020	0.14
P18	New Analytical Lab	21	2.5	27	480	1.6	0.051	0.24	0.55	0.03	0.067
P24	Vitrified Product Interim Storage	47	-	-	-	-	-	-	-	-	-
P27	Class A/C Grout in New Landfill Facility	21	4.7	5.3	100	0.33	0.12	2.1	1.8	0.37	0.013
P111	SBW Treatment with CsIX	17	2.1	24	430	1.4	0.043	0.14	0.44	0.013	0.061
P112A	Packaging and Loading CH-TRU for Transport to WIPP	17	-	-	-	-	-	-	-	-	-
P133	Waste Pilot Facility – Minimum INEEL Processing	17	5.8	71	1.3×10^3	4.2	0.12	0.32	1.2	0.019	0.18
and											
P59A	Calcine Retrieval and Transport – Minimum INEEL Processing	15	5.9	73	1.3×10^3	4.3	0.12	0.30	1.2	0.015	0.18
P117A	Packaging & Loading Calcine for Transport to Hanford	15	3.1	37	670	2.2	0.062	0.16	0.63	0.010	0.093
or											
P59B	Calcine Retrieval and Transport - JIT	2	-	-	-	-	-	-	-	-	-
P117B	Packaging & Loading Calcine for JIT Transport to Hanford	2	3.4	38	670	2.2	0.071	0.31	0.75	0.036	0.094
Totals			29	300	5.3×10^3	17	0.61	3.5	6.8	0.48	0.74

a. Emissions are from project data summaries and backup documentation.

b. Carbon dioxide has been associated with potential global warming.

c. Project is not expected to result in any usage of diesel fuel.

Table C.2-12. Projected emission rates (pounds per hour) of toxic air pollutants from combustion of fossil fuels to support waste processing operations.

Pollutant	Screening emission level ^a	No Action Alternative	Continued Current Operations Alternative	Separations Alternative			Non-Separations Alternative			Minimum INEEL Processing Alternative
				Full Separations Option	Planning Basis Option	Transuranic Separations Option	Hot Isostatic Pressed Waste Option	Direct Cement Waste Option	Early Vitrification Option	At INEEL
				Carcinogens						
Arsenic	1.5×10^{-6}	9.6×10^{-5}	1.5×10^{-4}	6.2×10^{-4}	8.1×10^{-4}	3.3×10^{-4}	2.7×10^{-4}	2.2×10^{-4}	1.2×10^{-4}	7.4×10^{-5}
Benzene	8.0×10^{-4}	1.6×10^{-5}	2.5×10^{-5}	1.0×10^{-4}	1.3×10^{-4}	5.4×10^{-5}	4.3×10^{-5}	3.6×10^{-5}	2.0×10^{-5}	1.2×10^{-5}
Beryllium	2.8×10^{-5}	2.0×10^{-6}	3.2×10^{-6}	1.3×10^{-5}	1.7×10^{-5}	7.0×10^{-6}	5.6×10^{-6}	4.7×10^{-6}	2.6×10^{-6}	1.6×10^{-6}
Cadmium	3.7×10^{-6}	2.9×10^{-5}	4.6×10^{-5}	1.9×10^{-4}	2.4×10^{-4}	1.0×10^{-4}	8.0×10^{-5}	6.7×10^{-5}	3.7×10^{-5}	2.2×10^{-5}
Chromium (hexavalent)	5.6×10^{-7}	1.8×10^{-5}	2.9×10^{-5}	1.2×10^{-4}	1.5×10^{-4}	6.3×10^{-5}	5.0×10^{-5}	4.2×10^{-5}	2.3×10^{-5}	1.4×10^{-5}
Formaldehyde	5.1×10^{-4}	2.4×10^{-3}	3.9×10^{-3}	0.016	0.02	8.3×10^{-3}	6.6×10^{-3}	5.6×10^{-3}	3.0×10^{-3}	1.8×10^{-3}
Nickel	2.7×10^{-5}	6.2×10^{-3}	9.9×10^{-3}	0.04	0.052	0.021	0.017	0.014	7.8×10^{-3}	4.7×10^{-3}
Polycyclic Aromatic Hydrocarbons	1.5×10^{-10}	9.6×10^{-7}	1.5×10^{-6}	6.2×10^{-6}	8.0×10^{-6}	3.3×10^{-6}	2.6×10^{-6}	2.2×10^{-6}	1.2×10^{-6}	7.3×10^{-7}
Noncarcinogens										
Antimony	0.033	3.8×10^{-4}	6.1×10^{-4}	2.5×10^{-3}	3.2×10^{-3}	1.6×10^{-3}	1.1×10^{-3}	8.9×10^{-4}	4.8×10^{-4}	2.9×10^{-4}
Barium	0.033	1.9×10^{-4}	3.0×10^{-4}	1.2×10^{-3}	1.3×10^{-3}	6.5×10^{-4}	5.2×10^{-4}	4.3×10^{-4}	2.4×10^{-4}	1.4×10^{-4}
Chloride	0.20	0.025	0.041	0.16	0.21	0.088	0.070	0.059	0.032	0.019
Chromium (total)	0.033	6.2×10^{-5}	9.9×10^{-5}	4.0×10^{-4}	5.2×10^{-4}	2.1×10^{-4}	1.7×10^{-4}	1.4×10^{-4}	7.8×10^{-5}	4.7×10^{-5}
Cobalt	3.3×10^{-3}	4.4×10^{-4}	7.0×10^{-4}	2.8×10^{-3}	3.7×10^{-3}	1.5×10^{-3}	1.2×10^{-3}	1.0×10^{-3}	5.5×10^{-4}	3.4×10^{-4}
Copper	0.013	1.3×10^{-4}	2.1×10^{-4}	8.3×10^{-4}	1.0×10^{-3}	4.4×10^{-4}	3.5×10^{-4}	3.0×10^{-4}	1.6×10^{-4}	9.8×10^{-5}
Ethyl benzene	29	4.8×10^{-6}	7.7×10^{-6}	3.1×10^{-5}	4.0×10^{-5}	1.7×10^{-5}	1.3×10^{-5}	1.1×10^{-5}	6.0×10^{-6}	3.7×10^{-6}
Fluoride	0.17	2.7×10^{-3}	4.4×10^{-3}	0.018	0.023	9.4×10^{-3}	7.5×10^{-3}	6.3×10^{-3}	3.4×10^{-3}	2.1×10^{-3}
Lead	-	1.1×10^{-4}	1.8×10^{-4}	7.1×10^{-4}	9.2×10^{-4}	3.8×10^{-4}	3.1×10^{-4}	2.6×10^{-4}	1.4×10^{-4}	8.4×10^{-5}
Manganese	0.33	2.2×10^{-4}	3.5×10^{-4}	1.4×10^{-3}	1.7×10^{-8}	7.6×10^{-4}	6.0×10^{-4}	5.1×10^{-4}	2.8×10^{-4}	1.7×10^{-4}
Mercury	3.0×10^{-3}	8.2×10^{-6}	1.3×10^{-5}	5.3×10^{-5}	6.9×10^{-5}	2.9×10^{-5}	2.3×10^{-5}	1.9×10^{-5}	1.0×10^{-5}	6.3×10^{-6}
Molybdenum	0.33	5.7×10^{-5}	9.2×10^{-5}	3.7×10^{-4}	4.8×10^{-4}	2.0×10^{-4}	1.6×10^{-4}	1.3×10^{-4}	7.2×10^{-5}	4.4×10^{-5}
Naphthalene	3.3	8.2×10^{-5}	1.3×10^{-4}	5.3×10^{-4}	6.9×10^{-4}	2.9×10^{-4}	2.3×10^{-4}	1.9×10^{-4}	1.0×10^{-4}	6.3×10^{-5}
Phosphorus	7.0×10^{-3}	6.9×10^{-4}	1.1×10^{-3}	4.5×10^{-3}	5.8×10^{-3}	2.4×10^{-3}	1.9×10^{-3}	1.6×10^{-3}	8.7×10^{-4}	5.3×10^{-4}
Selenium	0.013	5.0×10^{-5}	8.0×10^{-5}	3.2×10^{-4}	4.2×10^{-4}	1.7×10^{-4}	1.4×10^{-4}	1.2×10^{-4}	6.3×10^{-5}	3.8×10^{-5}
Toluene	25	4.5×10^{-4}	7.2×10^{-4}	2.9×10^{-3}	3.8×10^{-3}	1.6×10^{-3}	1.2×10^{-3}	1.0×10^{-3}	5.7×10^{-4}	3.5×10^{-4}

Table C.2-12. (continued).

Pollutant	Screening emission level ^a	No Action Alternative	Continued Current Operations Alternative	Separations Alternative			Non-Separations Alternative			Minimum INEEL Processing Alternative At INEEL
				Full Separations Option	Planning Basis Option	Transuranic Separations Option	Hot Isostatic Pressed Waste Option	Direct Cement Waste Option	Early Vitrification Option	
				Noncarcinogens (continued)						
1,1,1-Trichloroethane (methyl chloroform)	130	1.7×10^{-5}	2.8×10^{-5}	1.1×10^{-4}	1.4×10^{-4}	6.0×10^{-5}	4.8×10^{-5}	4.1×10^{-5}	2.2×10^{-5}	1.3×10^{-5}
Vanadium	3.3×10^{-3}	2.3×10^{-3}	3.7×10^{-3}	0.015	0.019	8.0×10^{-3}	6.4×10^{-3}	5.4×10^{-3}	2.9×10^{-3}	1.8×10^{-3}
Xylene	29	8.0×10^{-6}	1.3×10^{-5}	5.1×10^{-5}	6.6×10^{-5}	2.8×10^{-5}	2.2×10^{-5}	1.8×10^{-5}	1.0×10^{-5}	6.1×10^{-6}
Zinc	0.067	2.1×10^{-3}	3.4×10^{-3}	0.014	0.018	7.4×10^{-3}	5.9×10^{-3}	4.9×10^{-3}	2.7×10^{-3}	1.6×10^{-3}

a. Screening emission level listed in Rules for Control of Air Pollution in Idaho (IDHW 1997). Proposed new source emission rates exceeding these levels should be assessed for potential impacts on human health.

Table C.2-13. Projected emission rates (pounds per hour) of toxic air pollutants from chemical processing operations.^a

Pollutant	Screening emission level ^b	No Action Alternative	Continued Current Operations Alternative	Separations Alternative			Non-Separations Alternative			Minimum INEEL Processing Alternative
				Full Separations Option	Planning Basis Option	Transuranic Separations Option	Hot Isostatic Pressed Waste Option	Direct Cement Waste Option	Early Vitrification Option	
				Carcinogens						
Acetaldehyde	3.0×10^{-3}	-	4.1×10^{-7}	3.0×10^{-9}	4.1×10^{-7}	3.0×10^{-9}	4.2×10^{-7}	4.1×10^{-7}	2.6×10^{-9}	-
Arsenic	1.5×10^{-6}	-	-	3.4×10^{-9}	3.4×10^{-9}	3.4×10^{-9}	7.8×10^{-9}	3.8×10^{-13}	2.9×10^{-9}	-
Benzene	8.0×10^{-4}	-	5.0×10^{-7}	1.8×10^{-9}	5.0×10^{-7}	1.8×10^{-9}	5.0×10^{-7}	5.0×10^{-7}	6.0×10^{-7}	-
Benzo(a)pyrene	1.5×10^{-10}	-	2.8×10^{-9}	5.2×10^{-11}	2.9×10^{-9}	5.2×10^{-11}	2.9×10^{-9}	2.8×10^{-9}	1.2×10^{-6}	-
Beryllium	2.8×10^{-5}	-	6.2×10^{-12}	2.3×10^{-11}	2.9×10^{-11}	2.3×10^{-11}	5.9×10^{-11}	6.2×10^{-12}	2.6×10^{-11}	-
1,3-Butadiene	2.4×10^{-5}	-	2.1×10^{-8}	1.5×10^{-10}	2.1×10^{-8}	1.5×10^{-10}	2.1×10^{-8}	2.1×10^{-8}	1.3×10^{-10}	-
Cadmium	3.7×10^{-6}	-	-	3.9×10^{-8}	3.9×10^{-8}	3.9×10^{-8}	9.0×10^{-8}	4.3×10^{-12}	3.4×10^{-8}	7.3×10^{-9}
Carbon tetrachloride	4.4×10^{-4}	-	1.3×10^{-9}	4.9×10^{-12}	1.3×10^{-9}	4.9×10^{-12}	1.3×10^{-9}	1.3×10^{-9}	6.0×10^{-7}	-
Chloroform	2.8×10^{-4}	-	1.3×10^{-9}	4.9×10^{-12}	1.3×10^{-9}	4.9×10^{-12}	1.3×10^{-9}	1.3×10^{-9}	6.0×10^{-7}	-
Chromium (hexavalent)	5.6×10^{-7}	-	-	8.1×10^{-10}	8.1×10^{-10}	8.1×10^{-10}	1.9×10^{-9}	9.0×10^{-14}	6.9×10^{-10}	1.4×10^{-10}
1,2-Dichloroethane	2.5×10^{-4}	-	1.3×10^{-9}	4.9×10^{-12}	1.3×10^{-9}	4.9×10^{-12}	1.3×10^{-9}	1.3×10^{-9}	6.0×10^{-7}	-
Dioxins and furans	1.5×10^{-10}	-	3.1×10^{-11}	5.6×10^{-13}	3.2×10^{-11}	5.6×10^{-13}	3.2×10^{-11}	3.1×10^{-11}	4.9×10^{-13}	-
Formaldehyde	5.1×10^{-4}	-	6.3×10^{-7}	4.7×10^{-9}	6.3×10^{-7}	4.7×10^{-9}	6.4×10^{-7}	6.3×10^{-7}	5.3×10^{-7}	-
Hydrazine	2.3×10^{-6}	-	4.6×10^{-8}	3.4×10^{-10}	4.6×10^{-8}	3.4×10^{-10}	4.7×10^{-8}	4.6×10^{-8}	2.1×10^{-5}	-
Methylene chloride	1.6×10^{-3}	-	1.3×10^{-9}	4.9×10^{-12}	1.3×10^{-9}	4.9×10^{-12}	1.3×10^{-9}	1.3×10^{-9}	6.0×10^{-7}	-
Nickel	2.7×10^{-5}	-	-	2.0×10^{-8}	2.0×10^{-8}	2.0×10^{-8}	4.7×10^{-8}	2.3×10^{-12}	1.8×10^{-8}	3.3×10^{-9}
Polycyclic aromatic hydrocarbons	1.5×10^{-10}	-	2.1×10^{-8}	3.6×10^{-10}	2.2×10^{-8}	3.6×10^{-10}	2.3×10^{-8}	2.2×10^{-8}	3.1×10^{-10}	-
Paradioxane	0.71	-	1.0×10^{-6}	1.1×10^{-8}	1.0×10^{-6}	1.1×10^{-8}	1.0×10^{-6}	1.0×10^{-6}	4.6×10^{-4}	-
Perchloroethylene	9.1×10^{-5}	-	1.3×10^{-9}	4.9×10^{-12}	1.3×10^{-9}	4.9×10^{-12}	1.3×10^{-9}	1.3×10^{-9}	6.0×10^{-7}	-
Thiourea	1.2×10^{-5}	-	5.6×10^{-11}	2.0×10^{-9}	2.1×10^{-9}	2.0×10^{-9}	4.8×10^{-9}	1.2×10^{-9}	2.7×10^{-8}	-
1,1,2-Trichloroethane	4.2×10^{-4}	-	1.3×10^{-9}	9.8×10^{-12}	1.3×10^{-9}	9.8×10^{-12}	1.3×10^{-9}	1.3×10^{-9}	6.0×10^{-7}	-
Trichloroethylene	5.1×10^{-4}	-	1.3×10^{-9}	9.8×10^{-12}	1.3×10^{-9}	9.8×10^{-12}	1.3×10^{-9}	1.3×10^{-9}	6.0×10^{-7}	-
Noncarcinogens										
Acetonitrile	4.5	-	1.3×10^{-8}	4.7×10^{-11}	1.3×10^{-8}	4.7×10^{-11}	1.3×10^{-8}	1.3×10^{-8}	5.8×10^{-6}	-
Acrolein	0.017	-	4.9×10^{-8}	3.6×10^{-10}	4.9×10^{-8}	3.6×10^{-10}	5.0×10^{-8}	4.9×10^{-8}	3.1×10^{-10}	-
Antimony	0.033	-	8.7×10^{-10}	3.2×10^{-10}	1.2×10^{-9}	3.2×10^{-10}	1.6×10^{-9}	8.7×10^{-10}	1.2×10^{-9}	-
Barium	0.033	-	-	1.4×10^{-9}	1.4×10^{-9}	1.4×10^{-9}	3.2×10^{-9}	1.6×10^{-13}	1.2×10^{-9}	-
Bromoform	0.33	-	1.3×10^{-9}	4.9×10^{-12}	1.3×10^{-9}	4.9×10^{-12}	1.3×10^{-9}	1.3×10^{-9}	6.0×10^{-7}	-

Table C.2-13. Projected emission rates (pounds per hour) of toxic air pollutants from chemical processing operations (continued).

Pollutant	Screening emission level ^b	No Action Alternative	Continued Current Operations Alternative	Separations Alternative			Non-Separations Alternative			Minimum INEEL Processing Alternative
				Full Separations Option	Planning Basis Option	Transuranic Separations Option	Hot Isostatic Pressed Waste Option	Direct Cement Waste Option	Early Vitrification Option	
				Noncarcinogens (continued)						
Carbon disulfide	2.0	-	1.1×10^{-7}	7.9×10^{-10}	1.1×10^{-7}	7.9×10^{-10}	1.1×10^{-7}	1.1×10^{-7}	4.9×10^{-5}	-
Chloride	0.2	-	0.030	2.5×10^{-5}	0.030	2.5×10^{-5}	0.030	0.030	0.010	0.010
Chlorobenzene	23	-	1.3×10^{-9}	4.9×10^{-12}	1.3×10^{-9}	4.9×10^{-12}	1.3×10^{-9}	1.3×10^{-9}	6.0×10^{-7}	-
Chromium (total)	0.033	-	-	2.7×10^{-8}	2.7×10^{-8}	2.7×10^{-8}	6.3×10^{-8}	3.0×10^{-12}	2.3×10^{-8}	4.6×10^{-9}
Cobalt	3.3×10^{-3}	-	-	-	-	-	-	-	-	-
Copper	0.013	-	-	-	-	-	-	-	-	-
Diethyl phthalate	0.33	-	3.6×10^{-10}	6.6×10^{-12}	3.7×10^{-10}	6.6×10^{-12}	3.8×10^{-10}	3.6×10^{-10}	1.6×10^{-7}	-
Di-n-butyl phthalate	0.33	-	5.1×10^{-11}	9.4×10^{-13}	5.2×10^{-11}	9.4×10^{-13}	5.3×10^{-11}	5.2×10^{-11}	2.3×10^{-8}	-
di-n-octyl phthalate	0.33	-	5.1×10^{-13}	1.9×10^{-11}	2.0×10^{-11}	1.9×10^{-11}	4.4×10^{-11}	1.1×10^{-11}	2.5×10^{-10}	-
2,4-Dinitrophenol,	-	-	2.2×10^{-8}	2.4×10^{-10}	2.2×10^{-8}	2.4×10^{-10}	2.3×10^{-8}	2.2×10^{-8}	1.0×10^{-5}	-
Ethyl benzene	29	-	-	-	-	-	-	-	-	-
Fluoride	0.17	-	0.060	1.0×10^{-3}	0.060	1.0×10^{-3}	0.060	0.060	0.060	2.7×10^{-8}
Lead	-	-	9.6×10^{-8}	3.5×10^{-8}	1.3×10^{-7}	3.5×10^{-8}	1.8×10^{-7}	9.6×10^{-8}	1.3×10^{-7}	6.4×10^{-9}
Manganese	0.33	-	-	-	-	-	-	-	-	-
Mercury	3.0×10^{-3}	-	1.4×10^{-6}	5.4×10^{-5}	5.5×10^{-5}	5.4×10^{-5}	1.2×10^{-4}	3.0×10^{-5}	4.6×10^{-5}	5.0×10^{-9}
Methyl ethyl ketone	39	-	4.6×10^{-8}	1.7×10^{-10}	4.6×10^{-8}	1.7×10^{-10}	4.6×10^{-8}	4.6×10^{-8}	2.1×10^{-5}	-
Molybdenum	0.33	-	-	-	-	-	-	-	-	-
Naphthalene	3.3	-	4.8×10^{-8}	5.3×10^{-10}	4.9×10^{-8}	5.3×10^{-10}	4.9×10^{-8}	4.8×10^{-8}	1.2×10^{-6}	-
Pentachlorophenol	0.023	-	2.7×10^{-9}	5.0×10^{-11}	2.8×10^{-9}	5.0×10^{-11}	2.8×10^{-9}	2.7×10^{-9}	1.2×10^{-6}	-
Phenol	1.3	-	4.6×10^{-8}	6.8×10^{-10}	4.7×10^{-8}	6.8×10^{-10}	4.8×10^{-8}	4.6×10^{-8}	2.1×10^{-5}	-
Phosphorus	7.0×10^{-3}	-	-	-	-	-	-	-	-	-
Propylene (propene)	-	-	1.4×10^{-6}	1.0×10^{-8}	1.4×10^{-6}	1.0×10^{-8}	1.4×10^{-6}	1.4×10^{-6}	8.7×10^{-9}	-
Pyridine	1.0	-	3.9×10^{-6}	7.2×10^{-8}	4.0×10^{-6}	7.2×10^{-8}	4.1×10^{-6}	3.9×10^{-6}	2.0×10^{-3}	-
Selenium	0.013	-	4.3×10^{-10}	1.6×10^{-10}	5.9×10^{-10}	1.6×10^{-10}	7.9×10^{-10}	4.3×10^{-10}	5.7×10^{-10}	-
Silver	1.0×10^{-3}	-	-	5.3×10^{-10}	5.3×10^{-10}	5.3×10^{-10}	1.2×10^{-9}	5.8×10^{-14}	4.5×10^{-10}	6.0×10^{-11}
Thallium	7.0×10^{-3}	-	4.4×10^{-10}	1.6×10^{-9}	2.0×10^{-9}	1.6×10^{-9}	4.2×10^{-9}	4.4×10^{-10}	1.8×10^{-9}	-
Toluene	25	-	2.2×10^{-7}	8.1×10^{-10}	2.2×10^{-7}	8.1×10^{-10}	2.2×10^{-7}	2.2×10^{-7}	6.0×10^{-7}	-
1,2,4-Trichlorobenzene	2.5	-	8.1×10^{-11}	3.0×10^{-11}	1.1×10^{-10}	3.0×10^{-11}	1.5×10^{-10}	9.8×10^{-11}	3.7×10^{-8}	-

Table C.2-13. Projected emission rates (pounds per hour) of toxic air pollutants from chemical processing operations (continued).

Pollutant	Screening emission level ^b	No Action Alternative	Continued Current Operations Alternative	Separations Alternative			Non-Separations Alternative			Minimum INEEL Processing Alternative
				Full Separations Option	Planning Basis Option	Transuranic Separations Option	Hot Isostatic Pressed Waste Option	Direct Cement Waste Option	Early Vitrification Option	At INEEL
				Noncarcinogens (continued)						
1,1,1-Trichloroethane (methyl chloroform)	130	-	1.3×10^{-9}	9.8×10^{-12}	1.3×10^{-9}	9.8×10^{-12}	1.3×10^{-9}	1.3×10^{-9}	6.0×10^{-7}	-
Vanadium	3.0×10^{-3}	-	-	-	-	-	-	-	-	-
Xylene	29	-	1.5×10^{-7}	5.6×10^{-10}	1.5×10^{-7}	5.6×10^{-10}	1.5×10^{-7}	1.5×10^{-7}	4.8×10^{-10}	-
Zinc	0.067	-	-	-	-	-	-	-	-	-
Others										
Carbon dioxide	-	-	-	450	450	450	-	-	-	-
Carbon monoxide	-	-	0.19	2.0×10^{-3}	0.19	2.0×10^{-3}	0.20	0.19	0.28	-
Oxides of nitrogen	-	-	3.9	2.9	6.8	2.9	16	3.9	0.76	-
Particulate matter	-	-	1.5×10^{-6}	5.2×10^{-5}	5.4×10^{-5}	5.2×10^{-5}	1.2×10^{-4}	3.1×10^{-5}	4.7×10^{-5}	-
Sulfur dioxide	-	-	9.8	8.3	18	8.3	9.8	9.8	4.8	-
Total hydrocarbons	-	-	6.1×10^{-6}	8.8×10^{-8}	6.2×10^{-6}	8.8×10^{-8}	6.3×10^{-6}	6.1×10^{-6}	2.0×10^{-3}	-

a. Chemical process emissions do not include emissions formed by combustion of fossil fuels (see previous table).

b. Screening emission level listed in Rules for Control of Air Pollution in Idaho (IDHW 1997). Proposed new source emission rates exceeding these levels should be assessed for potential impacts on human health.

Table C.2-14. Cumulative impacts at public access locations of criteria pollutant emissions for project alternatives.

Pollutant	Averaging time	Impact of alternative (micrograms per cubic meter)			Cumulative impact (micrograms per cubic meter) ^{a,b}			Percent of standard		
		Site boundary	Public roads	Craters of the Moon	Site boundary	Public roads	Craters of the Moon	Site boundary	Public roads	Craters of the Moon
Carbon monoxide	1-hour	0.50	1.1	0.030	210	420	12	0.50	1.0	0.030
	8-hour	0.22	0.47	0.010	78	66	4.2	0.80	0.70	0.040
Nitrogen dioxide	Annual	0.02	0.06	1.0×10^{-3}	0.48	1.3	0.060	0.50	1.3	0.060
Sulfur dioxide	3-hour	5.1	9.2	0.30	29	48	4.0	2.2	3.7	0.30
	24-hour	1.1	2.2	0.070	6.4	12	1.3	1.8	3.3	0.40
Respirable particulates ^c	Annual	0.060	0.20	4.0×10^{-3}	0.20	0.65	0.020	0.30	0.8	0.030
	24-hour	0.030	0.060	2.0×10^{-3}	12	24	1.0	7.8	16	0.60
	Annual	2.0×10^{-3}	6.0×10^{-3}	1.2×10^{-4}	0.49	1.8	0.040	1.0	3.5	0.10
Lead	Quarterly	1.1×10^{-6}	3.0×10^{-6}	1.1×10^{-7}	2.3×10^{-4}	5.0×10^{-4}	5.5×10^{-5}	0.020	0.030	4.0×10^{-3}
Continued Current Operations Alternative										
Carbon monoxide	1-hour	3.1	8.7	0.63	210	430	13	0.50	1.1	0.030
	8-hour	1.3	3.2	0.11	79	69	4.3	0.80	0.70	0.040
Nitrogen dioxide	Annual	0.06	0.15	6.0×10^{-3}	0.50	1.4	0.06	0.50	1.4	0.060
Sulfur dioxide	3-hour	9.4	17	1.0	33	55	4.8	2.5	4.2	0.40
	24-hour	2.0	3.9	0.24	7.3	14	1.5	2.0	3.8	0.40
Respirable particulates	Annual	0.15	0.39	0.010	0.29	0.8	0.030	0.40	1.0	0.040
	24-hour	0.070	0.15	5.0×10^{-3}	12	25	1.0	7.9	16	0.60
	Annual	3.0×10^{-3}	0.010	2.4×10^{-4}	0.49	1.8	0.040	1.0	3.5	0.090
Lead	Quarterly	1.8×10^{-6}	4.9×10^{-6}	1.7×10^{-7}	2.3×10^{-4}	5.0×10^{-4}	5.5×10^{-5}	0.020	0.03	4.0×10^{-3}
Full Separations Option										
Carbon monoxide	1-hour	8.0	22	1.4	214	440	14	0.50	1.1	0.030
	8-hour	3.4	8.2	0.30	82	74	4.5	0.80	0.70	0.040
Nitrogen dioxide	Annual	0.16	0.47	0.01	0.62	1.7	0.070	0.6	1.7	0.070
Sulfur dioxide	3-hour	36	63	2.1	59	101	5.9	4.5	7.8	0.50
	24-hour	7.4	15	0.49	13	25	1.7	3.5	6.8	0.50
Respirable particulates	Annual	0.49	1.4	0.030	0.63	1.8	0.050	0.80	2.3	0.060
	24-hour	0.23	0.50	0.020	12	25	1.0	8.0	17	0.60
	Annual	0.010	0.040	8.6×10^{-4}	0.50	1.8	0.04	1.0	3.6	0.090
Lead	Quarterly	7.2×10^{-6}	2.0×10^{-5}	6.8×10^{-7}	2.4×10^{-4}	5.1×10^{-4}	5.6×10^{-5}	0.020	0.030	4.0×10^{-3}
Planning Basis Option										
Carbon monoxide	1-hour	10	27	1.7	220	450	14	0.50	1.1	0.040
	8-hour	4.2	10	0.33	82	76	4.5	0.80	0.80	0.050
Nitrogen dioxide	Annual	0.19	0.58	0.020	0.70	1.8	0.070	0.70	1.8	0.070
Sulfur dioxide	3-hour	42	76	3.2	66	110	6.9	5.0	8.8	0.50
	24-hour	8.9	18	0.77	14	28	2.0	3.9	7.7	0.60
Respirable particulates	Annual	0.57	1.7	0.040	0.70	2.1	0.060	0.90	2.6	0.080
	24-hour	0.28	0.61	0.020	12	25	1.0	8.0	17	0.70
	Annual	0.020	0.050	1.0×10^{-3}	0.51	1.8	0.040	1.0	3.6	0.090
Lead	Quarterly	8.7×10^{-6}	2.4×10^{-5}	8.2×10^{-7}	2.4×10^{-4}	5.2×10^{-4}	5.6×10^{-5}	0.020	0.030	4.0×10^{-3}

Table C.2-14. Cumulative impacts at public access locations of criteria pollutant emissions for project alternatives (continued).

Pollutant	Averaging time	Impact of alternative (micrograms per cubic meter)			Cumulative impact (micrograms per cubic meter) ^{a,b}			Percent of standard		
		Site boundary	Public roads	Craters of the Moon	Site boundary	Public roads	Craters of the Moon	Site boundary	Public roads	Craters of the Moon
Transuranic Separations Option										
Carbon monoxide	1-hour	5.1	14	0.96	210	430	13	0.50	1.1	0.030
	8-hour	2.2	5.3	0.18	80	71	4.4	0.80	0.70	0.040
Nitrogen dioxide	Annual	0.10	0.27	7.0×10^{-3}	0.56	1.5	0.06	0.60	1.5	0.060
Sulfur dioxide	3-hour	19	33	1.2	42	71	5.0	3.3	5.5	0.40
	24-hour	3.9	7.8	0.30	9.3	18	1.5	2.5	4.8	0.40
Respirable particulates	Annual	0.29	0.74	0.02	0.43	1.2	0.04	0.50	1.5	0.040
	24-hour	0.12	0.27	9.0×10^{-3}	12	25	1.0	7.9	16	0.60
Lead	Annual	7.0×10^{-3}	0.02	4.5×10^{-4}	0.50	1.8	0.04	1.0	3.5	0.090
	Quarterly	3.6×10^{-6}	9.8×10^{-6}	3.4×10^{-7}	2.3×10^{-4}	5.0×10^{-4}	5.5×10^{-5}	0.020	0.030	4.0×10^{-3}
Hot Isostatic Pressed Waste Option										
Carbon monoxide	1-hour	3.8	10	0.67	210	430	13	0.50	1.1	0.030
	8-hour	1.6	3.8	0.13	80	69	4.3	0.80	0.70	0.040
Nitrogen dioxide	Annual	0.14	0.32	0.020	0.60	1.5	0.070	0.60	1.5	0.070
Sulfur dioxide	3-hour	16	28	1.3	39	66	5.1	3.0	5.0	0.40
	24-hour	3.3	6.7	0.33	8.6	17	1.6	2.4	5.0	0.40
Respirable particulates	Annual	0.22	0.63	0.020	0.36	1.1	0.030	0.50	1.4	0.040
	24-hour	0.10	0.22	7.0×10^{-3}	12	25	1.0	7.9	16	0.64
Lead	Annual	6.0×10^{-3}	0.020	3.8×10^{-4}	0.50	1.8	0.040	1.0	3.5	0.090
	Quarterly	3.1×10^{-6}	8.6×10^{-6}	3.0×10^{-7}	2.3×10^{-4}	5.0×10^{-4}	5.5×10^{-5}	0.020	0.03	4.0×10^{-3}
Direct Cement Waste Option										
Carbon monoxide	1-hour	3.6	10	0.66	210	430	13	0.50	1.1	0.030
	8-hour	1.5	3.6	0.12	80	69	4.3	0.80	0.70	0.040
Nitrogen dioxide	Annual	0.07	0.20	6.0×10^{-3}	0.50	1.4	0.060	0.50	1.4	0.060
Sulfur dioxide	3-hour	13	24	1.2	37	62	5.0	2.8	5.0	0.39
	24-hour	2.8	5.7	0.30	8.2	16	1.5	2.2	4.3	0.40
Respirable particulates	Annual	0.20	0.54	0.020	0.34	1.0	0.030	0.40	1.2	0.040
	24-hour	0.090	0.20	6.0×10^{-3}	12	25	1.0	7.9	16	0.60
Lead	Annual	5.0×10^{-3}	0.020	3.3×10^{-4}	0.49	1.8	0.040	1.0	3.5	0.090
	Quarterly	2.6×10^{-6}	7.3×10^{-6}	2.5×10^{-7}	2.3×10^{-4}	5.0×10^{-4}	5.5×10^{-5}	0.020	0.030	4.0×10^{-3}
Early Vitrification Option										
Carbon monoxide	1-hour	1.4	2.5	0.090	210	421	12	0.50	1.1	0.030
	8-hour	0.41	0.77	0.030	79	66	4.2	0.80	0.70	0.040
Nitrogen dioxide	Annual	0.030	0.090	2.0×10^{-3}	0.50	1.3	0.06	0.50	1.3	0.060
Sulfur dioxide	3-hour	8.2	14	0.54	32	53	4.3	2.4	4.1	0.30
	24-hour	1.7	3.4	0.12	7.1	13	1.4	1.9	3.6	0.40
Respirable particulates	Annual	0.14	0.33	9.0×10^{-3}	0.28	0.78	0.030	0.40	1.0	0.030
	24-hour	0.040	0.080	0.00	12	24	1.0	7.9	16	0.6
Lead	Annual	2.0×10^{-3}	7.0×10^{-3}	1.5×10^{-4}	0.49	1.8	0.040	1.0	3.5	0.090
	Quarterly	1.5×10^{-6}	4.0×10^{-6}	1.4×10^{-7}	2.3×10^{-4}	5.0×10^{-4}	5.5×10^{-5}	0.020	0.030	4.0×10^{-3}

Table C.2-14. Cumulative impacts at public access locations of criteria pollutant emissions for project alternatives (continued).

Pollutant	Averaging time	Impact of alternative (micrograms per cubic meter)			Cumulative impact (micrograms per cubic meter) ^{a,b}			Percent of standard		
		Site boundary	Public roads	Craters of the Moon	Site boundary	Public roads	Craters of the Moon	Site boundary	Public roads	Craters of the Moon
		Minimum INEEL Processing Alternative								
Carbon monoxide	1-hour	1.5	4.3	0.31	210	423	13	0.50	1.1	0.030
	8-hour	0.63	1.6	0.060	79	67	4.3	0.80	0.70	0.040
Nitrogen dioxide	Annual	0.020	0.05	1.0×10^{-3}	0.50	1.3	0.060	0.50	1.3	0.060
Sulfur dioxide	3-hour	3.4	6.1	0.18	27	45	4.0	2.1	3.4	0.30
	24-hour	0.71	1.5	0.040	6.0	11	1.3	1.7	3.1	0.35
	Annual	0.040	0.13	3.0×10^{-3}	0.18	0.58	0.020	0.20	0.70	0.020
Respirable particulates	24-hour	0.030	0.06	2.0×10^{-3}	12	24	1.0	7.8	16	0.60
	Annual	1.0×10^{-3}	5.0×10^{-3}	1.0×10^{-4}	0.50	1.8	0.040	1.0	3.5	0.090
Lead	Quarterly	7.2×10^{-7}	2.0×10^{-6}	6.8×10^{-8}	2.3×10^{-4}	5.0×10^{-4}	5.5×10^{-5}	0.020	0.030	4.0×10^{-3}

a. Cumulative impacts are assessed as the sum of the baseline plus the impacts of proposed projects. Baseline and standards are provided in Table C.2-15.

b. This summation is conservative since in most cases the highest concentration for each (baseline and alternative) would occur at different locations.

c. Values do not include contributions of fugitive dust.

Table C.2-16. Summary of maximum toxic air pollutant concentrations at onsite and offsite locations by waste processing alternative.

Highest percentage of applicable standard and identification of controlling pollutant ^{a,b}									
Receptor			Separations Alternative			Non-Separations Alternative			Minimum INEEL Processing Alternative
	No Action Alternative	Continued Current Operations Alternative	Full Separations Option	Planning Basis Option	Transuranic Separations Option	Hot Isostatic Pressed Waste Option	Direct Cement Waste Option	Early Vitrification Option	
	Carcinogens: Maximum impact due to nickel								
INEEL boundary areas	1.8	2.9	12	14	5.8	5.1	4.3	2.4	1.2
Craters of the Moon	0.12	0.19	0.75	0.90	0.37	0.33	0.28	0.15	0.080
INEEL facility area ^c	0.03	0.13	0.30	0.37	0.21	0.14	0.14	0.04	0.060
Noncarcinogens: Maximum impact due to vanadium									
INEEL boundary areas	0.020	0.030	0.14	0.17	0.070	0.060	0.050	0.030	0.010
Craters of the Moon	1.0×10^{-3}	2.0×10^{-3}	8.0×10^{-3}	9.0×10^{-3}	4.0×10^{-3}	3.0×10^{-3}	3.0×10^{-3}	2.0×10^{-3}	8.0×10^{-4}
Public road locations	0.040	0.060	0.26	0.31	0.13	0.11	0.10	0.05	0.03
INEEL facility area ^c	0.02	0.10	0.22	0.28	0.15	0.11	0.10	0.03	0.05

- a. Applicable ambient air standards are specified in IDHW (1997) for carcinogenic air pollutants and noncarcinogenic toxic air pollutant increments. It should be noted that these standards apply only to new sources; for existing sources, they are used here as reference values for purposes of comparison.
- b. Applicable standard for onsite levels is the 8-hour occupational exposure limit established by either the American Conference of Government Industrial Hygienists or the Occupational Safety and Health Administration; the lower of the two is used.
- c. Location of highest onsite impacts is within INTEC.

Table C.2-17. Concentrations of toxic air pollutants (micrograms per cubic meters) at ambient air locations under waste processing alternatives.

Pollutant	Averaging time	Idaho Standard (micrograms per cubic meter) ^a	Separations Alternative				Non-Separations Alternative				Minimum INEEL Processing Alternative	Maximum concentration as a percent of standard	
			No Action Alternative	Continued Current Operations Alternative	Full Separations Option	Planning Basis Option	Transuranic Separations Option	Hot Isostatic Pressed Waste Option	Direct Cement Waste Option	Early Vitrification Option			
			Maximum Concentrations (micrograms per cubic meter) at or Beyond the Site Boundary Carcinogens										
Acetaldehyde	Annual	0.45	-	2.3×10^{-9}	3.8×10^{-11}	2.3×10^{-9}	3.7×10^{-11}	2.3×10^{-9}	2.3×10^{-9}	3.2×10^{-11}	-	<0.001	
Arsenic	Annual	2.3×10^{-4}	1.2×10^{-6}	1.9×10^{-6}	7.7×10^{-6}	9.3×10^{-6}	3.8×10^{-6}	3.4×10^{-6}	2.8×10^{-6}	1.6×10^{-6}	7.7×10^{-7}	4.0	
Benzene	Annual	0.12	1.9×10^{-7}	3.1×10^{-7}	1.2×10^{-6}	1.5×10^{-6}	6.2×10^{-7}	5.5×10^{-7}	4.6×10^{-7}	2.6×10^{-7}	1.3×10^{-7}	0.001	
Benzo(a)pyrene	Annual	3.0×10^{-4}	-	1.5×10^{-11}	6.7×10^{-13}	1.6×10^{-11}	6.5×10^{-13}	1.6×10^{-11}	1.6×10^{-11}	1.5×10^{-8}	-	0.005	
Beryllium	Annual	4.0×10^{-3}	2.5×10^{-8}	4.0×10^{-8}	1.6×10^{-7}	2.0×10^{-7}	8.1×10^{-8}	7.1×10^{-8}	6.0×10^{-8}	3.3×10^{-8}	1.6×10^{-8}	0.005	
1,3-Butadiene	Annual	4.0×10^{-3}	-	1.2×10^{-10}	1.9×10^{-12}	1.2×10^{-10}	1.9×10^{-12}	1.2×10^{-10}	1.2×10^{-10}	1.6×10^{-12}	-	<0.001	
Cadmium	Annual	5.6×10^{-4}	3.6×10^{-7}	5.7×10^{-7}	2.3×10^{-6}	2.8×10^{-6}	1.2×10^{-6}	1.0×10^{-6}	8.5×10^{-7}	4.8×10^{-7}	2.3×10^{-7}	0.5	
Carbon tetrachloride	Annual	0.067	-	7.2×10^{-12}	6.3×10^{-14}	7.2×10^{-12}	6.1×10^{-14}	7.2×10^{-12}	7.2×10^{-12}	7.4×10^{-9}	-	<0.001	
Chloroform	Annual	0.043	-	7.2×10^{-12}	6.3×10^{-14}	7.2×10^{-12}	6.1×10^{-14}	7.2×10^{-12}	7.2×10^{-12}	7.4×10^{-9}	-	<0.001	
Chromium (hexavalent)	Annual	8.3×10^{-5}	2.2×10^{-7}	3.6×10^{-7}	1.4×10^{-6}	1.7×10^{-6}	7.2×10^{-7}	6.3×10^{-7}	5.3×10^{-7}	3.0×10^{-7}	1.4×10^{-7}	2.0	
1,2-Dichloroethane	Annual	0.038	-	7.2×10^{-12}	6.3×10^{-14}	7.2×10^{-12}	6.1×10^{-14}	7.2×10^{-12}	7.2×10^{-12}	7.4×10^{-9}	-	<0.001	
Dioxins and furans	Annual	2.2×10^{-8}	-	1.7×10^{-13}	7.2×10^{-15}	1.7×10^{-13}	7.0×10^{-15}	1.8×10^{-13}	1.7×10^{-13}	6.1×10^{-15}	-	<0.001	
Formaldehyde	Annual	0.077	3.0×10^{-5}	4.7×10^{-5}	1.9×10^{-4}	2.3×10^{-4}	9.6×10^{-5}	8.4×10^{-5}	7.1×10^{-5}	4.0×10^{-5}	1.9×10^{-5}	0.30	
Hydrazine	Annual	3.4×10^{-4}	-	2.5×10^{-10}	4.4×10^{-12}	2.6×10^{-10}	4.2×10^{-12}	2.6×10^{-10}	2.5×10^{-10}	2.6×10^{-7}	-	0.08	
Methylene chloride	Annual	0.28	-	7.2×10^{-12}	6.3×10^{-14}	7.2×10^{-12}	6.1×10^{-14}	7.2×10^{-12}	7.2×10^{-12}	7.4×10^{-9}	-	<0.001	
Nickel	Annual	4.0×10^{-3}	7.6×10^{-5}	1.2×10^{-4}	4.9×10^{-4}	5.9×10^{-4}	2.5×10^{-4}	2.1×10^{-4}	1.8×10^{-4}	1.0×10^{-4}	4.9×10^{-5}	14	
Polycyclic aromatic hydrocarbons	Annual	3.0×10^{-4}	5.6×10^{-8}	8.9×10^{-8}	3.6×10^{-7}	4.4×10^{-7}	1.8×10^{-7}	1.6×10^{-7}	1.3×10^{-7}	7.4×10^{-8}	3.6×10^{-8}	0.1	
Paradioxane	Annual	0.71	-	-	-	-	-	-	-	-	-	<0.001	
Perchloroethylene	Annual	0.014	-	7.2×10^{-12}	6.3×10^{-14}	7.2×10^{-12}	6.1×10^{-14}	7.2×10^{-12}	7.2×10^{-12}	7.4×10^{-9}	-	<0.001	
Thiourea	Annual	2.0×10^{-3}	-	3.1×10^{-13}	2.6×10^{-11}	1.1×10^{-11}	2.5×10^{-11}	2.6×10^{-11}	6.4×10^{-12}	3.3×10^{-10}	-	<0.001	
1,1,2-Trichloroethane	Annual	0.062	-	7.2×10^{-12}	1.3×10^{-13}	7.2×10^{-12}	1.2×10^{-13}	7.3×10^{-12}	7.2×10^{-12}	7.4×10^{-9}	-	<0.001	
Trichloroethylene	Annual	0.077	-	7.2×10^{-12}	1.3×10^{-13}	7.2×10^{-12}	1.2×10^{-13}	7.3×10^{-12}	7.2×10^{-12}	7.4×10^{-9}	-	<0.001	
Noncarcinogens													
Acetonitrile	24 Hour	3,350	-	8.8×10^{-10}	7.6×10^{-12}	8.8×10^{-10}	7.2×10^{-12}	8.9×10^{-10}	8.8×10^{-10}	7.4×10^{-7}	-	<0.001	
Acrolein	24 Hour	13	-	3.3×10^{-9}	5.8×10^{-11}	3.3×10^{-9}	5.5×10^{-11}	3.4×10^{-9}	3.3×10^{-9}	4.0×10^{-11}	-	<0.001	
Antimony	24 Hour	25	8.8×10^{-5}	1.4×10^{-4}	5.7×10^{-4}	6.9×10^{-4}	2.9×10^{-4}	2.5×10^{-4}	2.1×10^{-4}	1.2×10^{-4}	5.8×10^{-5}	0.003	
Barium	24 Hour	25	4.3×10^{-5}	7.0×10^{-5}	2.8×10^{-4}	3.4×10^{-4}	1.4×10^{-4}	1.2×10^{-4}	1.0×10^{-4}	5.7×10^{-5}	2.8×10^{-5}	0.001	
Bromoform	24 Hour	250	-	8.8×10^{-11}	7.9×10^{-13}	8.8×10^{-11}	7.5×10^{-13}	8.9×10^{-11}	8.8×10^{-11}	7.7×10^{-8}	-	<0.001	
Carbon disulfide	24 Hour	1,500	-	7.5×10^{-9}	1.3×10^{-10}	7.5×10^{-9}	1.2×10^{-10}	7.6×10^{-9}	7.5×10^{-9}	6.3×10^{-6}	-	<0.001	
Chloride	24 Hour	150	6.0×10^{-3}	0.010	0.040	0.050	0.020	0.020	0.020	0.010	5.0×10^{-3}	0.03	
Chlorobenzene	24 Hour	17,500	-	8.8×10^{-11}	7.9×10^{-13}	8.8×10^{-11}	7.5×10^{-13}	8.9×10^{-11}	8.8×10^{-11}	7.7×10^{-8}	-	<0.001	
Chromium (total)	24 Hour	25	1.4×10^{-5}	2.3×10^{-5}	9.2×10^{-5}	1.1×10^{-4}	4.6×10^{-5}	4.0×10^{-5}	3.4×10^{-5}	1.9×10^{-5}	4.6×10^{-5}	<0.001	
Cobalt	24 Hour	3.0	1.0×10^{-4}	1.6×10^{-4}	6.6×10^{-4}	7.9×10^{-4}	3.3×10^{-4}	2.9×10^{-4}	2.4×10^{-4}	1.3×10^{-4}	3.3×10^{-4}	0.03	
Copper	24 Hour	10	3.0×10^{-5}	4.8×10^{-5}	1.9×10^{-4}	2.3×10^{-4}	9.6×10^{-5}	8.4×10^{-5}	7.1×10^{-5}	3.9×10^{-5}	9.6×10^{-5}	0.002	
Diethyl phthalate	24 Hour	250	-	2.4×10^{-11}	1.1×10^{-12}	2.5×10^{-11}	1.0×10^{-12}	2.5×10^{-11}	2.5×10^{-11}	2.0×10^{-8}	1.0×10^{-12}	<0.001	
Di-n-butyl phthalate	24 Hour	250	-	3.5×10^{-12}	1.5×10^{-13}	3.5×10^{-12}	1.4×10^{-13}	3.6×10^{-12}	3.5×10^{-12}	2.9×10^{-9}	1.4×10^{-13}	<0.001	
Di-n-octyl phthalate	24 Hour	250	-	3.5×10^{-14}	3.9×10^{-11}	1.5×10^{-9}	3.7×10^{-11}	1.5×10^{-9}	1.5×10^{-9}	1.3×10^{-11}	3.7×10^{-11}	<0.001	

Table C.2-17. Concentrations of toxic air pollutants (micrograms per cubic meters) at ambient air locations under waste processing alternatives (continued).

Pollutant	Averaging time	Idaho Standard (micrograms per cubic meter) ^a	No Action Alternative	Separations Alternative			Non-Separations Alternative			Minimum INEEL Processing Alternative	Maximum concentration as a percent of standard
				Continued Current Operations Alternative	Full Separations Option	Planning Basis Option	Transuranic Separations Option	Hot Isostatic Pressed Waste Option	Direct Cement Waste Option		
Maximum Concentrations (micrograms per cubic meter) at or Beyond the Site Boundary Noncarcinogens (continued)											
2,4-Dinitrophenol	24 Hour	-	-	1.5×10^{-9}	3.1×10^{-12}	1.3×10^{-12}	2.9×10^{-12}	7.1×10^{-13}	3.1×10^{-11}	2.9×10^{-12}	-
Ethyl benzene	24 Hour	22,000	1.1×10^{-6}	1.8×10^{-6}	7.1×10^{-6}	8.6×10^{-6}	3.6×10^{-6}	3.1×10^{-6}	2.6×10^{-6}	1.5×10^{-6}	3.6×10^{-6}
Fluoride	24 Hour	125	6.3×10^{-4}	4.0×10^{-3}	4.0×10^{-3}	7.0×10^{-3}	3.0×10^{-3}	4.7×10^{-3}	4.5×10^{-3}	7.7×10^{-3}	2.1×10^{-3}
Lead	24 Hour	-	2.5×10^{-5}	4.1×10^{-5}	1.6×10^{-4}	2.0×10^{-4}	8.2×10^{-5}	7.2×10^{-5}	6.1×10^{-5}	3.4×10^{-5}	8.2×10^{-5}
Manganese	24 Hour	50	5.0×10^{-5}	8.1×10^{-5}	3.3×10^{-4}	3.9×10^{-4}	1.6×10^{-4}	1.4×10^{-4}	1.2×10^{-4}	6.7×10^{-5}	1.6×10^{-4}
Mercury	24 Hour	5	1.9×10^{-6}	3.1×10^{-6}	1.6×10^{-5}	1.6×10^{-5}	1.1×10^{-5}	1.1×10^{-5}	5.4×10^{-6}	7.2×10^{-6}	1.1×10^{-5}
Methyl ethyl ketone	24 Hour	29,500	-	3.1×10^{-9}	2.7×10^{-11}	3.1×10^{-11}	2.6×10^{-11}	3.1×10^{-9}	3.1×10^{-9}	2.7×10^{-6}	2.6×10^{-11}
Molybdenum	24 Hour	250	1.3×10^{-5}	2.1×10^{-5}	8.6×10^{-5}	1.0×10^{-4}	4.3×10^{-5}	3.8×10^{-5}	3.2×10^{-5}	1.8×10^{-5}	4.3×10^{-5}
Naphthalene	24 Hour	2,500	1.9×10^{-5}	3.1×10^{-5}	1.2×10^{-4}	1.5×10^{-4}	6.2×10^{-5}	5.4×10^{-5}	4.6×10^{-5}	2.5×10^{-5}	6.2×10^{-5}
Pentachlorophenol	24 Hour	25	-	1.8×10^{-10}	8.1×10^{-12}	1.9×10^{-10}	7.7×10^{-12}	1.9×10^{-10}	1.8×10^{-10}	1.5×10^{-7}	7.7×10^{-12}
Phenol	24 Hour	950	-	3.1×10^{-9}	1.4×10^{-10}	3.2×10^{-9}	1.3×10^{-10}	3.2×10^{-9}	3.1×10^{-9}	2.7×10^{-6}	1.3×10^{-10}
Phosphorus	24 Hour	5	1.6×10^{-4}	2.6×10^{-4}	1.0×10^{-3}	1.2×10^{-3}	5.2×10^{-4}	4.5×10^{-4}	3.8×10^{-4}	2.1×10^{-4}	5.2×10^{-4}
Propylene (propene)	24 Hour	-	-	9.5×10^{-8}	1.6×10^{-9}	9.6×10^{-8}	1.5×10^{-9}	9.6×10^{-8}	9.5×10^{-8}	1.1×10^{-9}	1.5×10^{-9}
Pyridine	24 Hour	750	-	2.6×10^{-7}	1.2×10^{-8}	2.7×10^{-7}	1.1×10^{-8}	2.8×10^{-7}	2.7×10^{-7}	2.3×10^{-8}	1.1×10^{-8}
Selenium	24 Hour	10	1.1×10^{-5}	1.8×10^{-5}	7.4×10^{-5}	9.0×10^{-5}	3.7×10^{-5}	3.3×10^{-5}	2.8×10^{-5}	1.5×10^{-5}	3.7×10^{-5}
Silver	24 Hour	5	-	-	8.5×10^{-11}	3.6×10^{-11}	8.1×10^{-11}	8.1×10^{-11}	3.9×10^{-15}	5.7×10^{-11}	8.1×10^{-11}
Thallium	24 Hour	5	-	3.0×10^{-11}	2.6×10^{-10}	1.4×10^{-10}	2.5×10^{-10}	2.9×10^{-10}	3.0×10^{-11}	2.4×10^{-10}	2.5×10^{-10}
Toluene	24 Hour	18,750	1.0×10^{-4}	1.7×10^{-4}	6.8×10^{-4}	8.2×10^{-4}	3.4×10^{-4}	3.0×10^{-4}	2.5×10^{-4}	1.4×10^{-4}	3.4×10^{-4}
1,2,4-	24 Hour	1,850	-	5.5×10^{-12}	4.8×10^{-12}	7.5×10^{-12}	4.6×10^{-12}	1.0×10^{-11}	6.6×10^{-12}	4.7×10^{-9}	4.6×10^{-12}
Trichlorobenzene											
1,1,1-Trichloroethane (methyl chloroform)	24 Hour	95,500	4.0×10^{-6}	6.4×10^{-6}	2.6×10^{-5}	3.1×10^{-5}	1.3×10^{-5}	1.1×10^{-5}	9.5×10^{-6}	5.3×10^{-6}	1.3×10^{-5}
Vanadium	24 Hour	3	5.3×10^{-4}	8.6×10^{-4}	3.0×10^{-3}	4.0×10^{-3}	1.7×10^{-3}	2.0×10^{-3}	1.0×10^{-3}	7.1×10^{-4}	2.0×10^{-3}
Xylene	24 Hour	21,750	1.8×10^{-6}	3.0×10^{-6}	1.2×10^{-5}	1.4×10^{-5}	5.9×10^{-6}	5.2×10^{-6}	4.4×10^{-6}	2.4×10^{-6}	5.9×10^{-6}
Zinc	24 Hour	500	4.9×10^{-4}	7.9×10^{-4}	3.0×10^{-3}	4.0×10^{-3}	1.6×10^{-3}	1.0×10^{-3}	1.0×10^{-3}	6.5×10^{-4}	2.0×10^{-3}
Maximum Concentrations (micrograms per cubic meter) at Public Highways Noncarcinogens^b											
Acetonitrile	24 Hour	3,350	-	1.0×10^{-9}	7.3×10^{-12}	1.0×10^{-9}	7.2×10^{-12}	1.0×10^{-9}	1.0×10^{-9}	9.4×10^{-7}	-
Acrolein	24 Hour	13	-	3.9×10^{-9}	5.6×10^{-11}	3.9×10^{-9}	5.5×10^{-11}	3.9×10^{-9}	3.9×10^{-9}	5.0×10^{-11}	-
Antimony	24 Hour	25	1.6×10^{-4}	2.7×10^{-4}	1.0×10^{-3}	1.0×10^{-3}	5.3×10^{-4}	4.7×10^{-4}	3.9×10^{-4}	2.2×10^{-4}	1.1×10^{-4}
Barium	24 Hour	25	8.0×10^{-5}	1.3×10^{-4}	5.2×10^{-4}	6.3×10^{-4}	2.6×10^{-4}	2.3×10^{-4}	1.9×10^{-4}	1.1×10^{-4}	5.3×10^{-5}
Bromoform	24 Hour	250	-	1.0×10^{-10}	7.7×10^{-13}	1.0×10^{-10}	7.5×10^{-13}	1.0×10^{-10}	1.0×10^{-10}	9.7×10^{-8}	-
Carbon disulfide	24 Hour	1,500	-	8.7×10^{-9}	1.2×10^{-10}	8.8×10^{-9}	1.2×10^{-10}	8.9×10^{-9}	8.7×10^{-9}	7.9×10^{-6}	-
Chloride	24 Hour	150	0.01	0.02	0.07	0.09	0.04	0.03	0.03	0.02	8.0×10^{-3}
Chlorobenzene	24 Hour	17,500	-	1.0×10^{-10}	7.7×10^{-13}	1.0×10^{-10}	7.5×10^{-13}	1.0×10^{-10}	1.0×10^{-10}	9.7×10^{-8}	-
Chromium (total)	24 Hour	25	2.6×10^{-5}	4.3×10^{-5}	1.7×10^{-4}	2.1×10^{-4}	8.6×10^{-5}	7.5×10^{-5}	6.3×10^{-5}	3.5×10^{-5}	1.7×10^{-5}
Cobalt	24 Hour	3	1.9×10^{-4}	3.0×10^{-4}	1.0×10^{-3}	1.0×10^{-3}	6.1×10^{-4}	5.3×10^{-4}	4.5×10^{-4}	2.5×10^{-4}	1.2×10^{-4}
Copper	24 Hour	10	5.5×10^{-5}	8.9×10^{-5}	3.6×10^{-4}	4.3×10^{-4}	1.8×10^{-4}	1.6×10^{-4}	1.3×10^{-4}	7.3×10^{-5}	3.6×10^{-5}
Diethyl phthalate	24 Hour	250	-	2.9×10^{-11}	1.0×10^{-12}	2.9×10^{-11}	1.0×10^{-12}	3.0×10^{-11}	2.9×10^{-11}	2.6×10^{-8}	-

Table C.2-17. Concentrations of toxic air pollutants (micrograms per cubic meters) at ambient air locations under waste processing alternatives (continued).

Pollutant	Averaging time	Idaho Standard (micrograms per cubic meter) ^a	Separations Alternative				Non-Separations Alternative				Minimum INEEL Processing Alternative	Maximum concentration as a percent of standard
			No Action Alternative	Continued Current Operations Alternative	Full Separations Option	Planning Basis Option	Transuranic Separations Option	Hot Isostatic Pressed Waste Option	Direct Cement Waste Option	Early Vitrification Option		
Maximum Concentrations (micrograms per cubic meter) at Public Highways Noncarcinogens (continued)												
Di-n-butyl phthalate	24 Hour	250	-	4.0×10^{-12}	1.5×10^{-13}	4.1×10^{-12}	1.4×10^{-13}	4.2×10^{-12}	4.1×10^{-12}	3.7×10^{-9}	-	<0.001
Di-n-octyl phthalate	24 Hour	250	-	4.0×10^{-14}	3.7×10^{-11}	1.8×10^{-9}	3.7×10^{-11}	1.8×10^{-9}	1.8×10^{-9}	1.6×10^{-6}	-	<0.001
2,4-Dinitrophenol	24 Hour	-	-	1.7×10^{-9}	3.0×10^{-12}	1.5×10^{-12}	2.9×10^{-12}	3.4×10^{-12}	8.3×10^{-13}	4.0×10^{-11}	-	-
Ethyl benzene	24 Hour	22,000	2.0×10^{-6}	3.3×10^{-6}	1.3×10^{-5}	1.6×10^{-5}	6.7×10^{-6}	5.8×10^{-6}	4.9×10^{-6}	2.7×10^{-6}	1.4×10^{-6}	<0.001
Fluoride	24 Hour	125	1.0×10^{-3}	6.0×10^{-3}	8.0×10^{-3}	0.01	4.0×10^{-3}	7.0×10^{-3}	6.0×10^{-3}	0.01	7.7×10^{-4}	0.009
Lead	24 Hour	-	4.7×10^{-5}	7.6×10^{-5}	3.1×10^{-4}	3.7×10^{-4}	1.5×10^{-4}	1.3×10^{-4}	1.1×10^{-4}	6.2×10^{-5}	3.1×10^{-5}	-
Manganese	24 Hour	50	9.3×10^{-5}	1.5×10^{-4}	6.1×10^{-4}	7.4×10^{-4}	3.1×10^{-4}	2.7×10^{-4}	2.3×10^{-4}	1.2×10^{-4}	6.2×10^{-5}	0.001
Mercury	24 Hour	5	3.5×10^{-6}	5.8×10^{-6}	2.6×10^{-5}	3.0×10^{-5}	1.5×10^{-5}	1.6×10^{-5}	9.6×10^{-6}	1.0×10^{-5}	2.3×10^{-6}	<0.001
Methyl ethyl ketone	24 Hour	29,500	-	3.6×10^{-9}	2.7×10^{-11}	3.7×10^{-9}	2.6×10^{-11}	3.7×10^{-9}	3.7×10^{-9}	3.4×10^{-6}	-	<0.001
Molybdenum	24 Hour	250	2.4×10^{-5}	4.0×10^{-5}	1.6×10^{-4}	1.9×10^{-4}	8.0×10^{-5}	7.0×10^{-5}	5.9×10^{-5}	3.3×10^{-5}	1.6×10^{-5}	<0.001
Naphthalene	24 Hour	2,500	3.5×10^{-5}	5.7×10^{-5}	2.3×10^{-4}	2.8×10^{-4}	1.1×10^{-4}	1.0×10^{-4}	8.5×10^{-5}	4.7×10^{-5}	2.3×10^{-5}	<0.001
Pentachlorophenol	24 Hour	25	-	2.1×10^{-10}	7.8×10^{-12}	2.2×10^{-10}	7.6×10^{-12}	2.2×10^{-10}	2.2×10^{-10}	1.9×10^{-7}	-	<0.001
Phenol	24 Hour	950	-	3.6×10^{-9}	1.4×10^{-10}	3.7×10^{-9}	1.3×10^{-10}	3.8×10^{-9}	3.7×10^{-9}	3.4×10^{-6}	-	<0.001
Phosphorus	24 Hour	5	2.9×10^{-4}	4.8×10^{-4}	1.9×10^{-3}	2.3×10^{-3}	9.6×10^{-4}	8.4×10^{-4}	7.1×10^{-4}	3.9×10^{-4}	2.0×10^{-4}	0.05
Propylene (propene)	24 Hour	-	-	1.1×10^{-7}	1.6×10^{-9}	1.1×10^{-7}	1.5×10^{-9}	1.1×10^{-7}	1.1×10^{-7}	1.4×10^{-9}	-	-
Pyridine	24 Hour	750	-	3.1×10^{-7}	1.1×10^{-8}	3.1×10^{-7}	1.1×10^{-8}	3.2×10^{-7}	3.1×10^{-7}	2.9×10^{-4}	-	<0.001
Selenium	24 Hour	10	2.1×10^{-5}	3.5×10^{-5}	1.4×10^{-4}	1.7×10^{-4}	7.0×10^{-5}	6.1×10^{-5}	5.1×10^{-5}	2.8×10^{-5}	1.4×10^{-5}	0.002
Silver	24 Hour	5	-	-	8.3×10^{-11}	4.2×10^{-11}	8.1×10^{-11}	9.5×10^{-11}	4.6×10^{-15}	7.3×10^{-11}	9.1×10^{-12}	<0.001
Thallium	24 Hour	5	-	3.5×10^{-11}	2.5×10^{-10}	1.6×10^{-10}	2.4×10^{-10}	3.4×10^{-10}	3.5×10^{-11}	3.0×10^{-10}	-	<0.001
Toluene	24 Hour	18,750	1.9×10^{-4}	3.1×10^{-4}	1.3×10^{-3}	1.5×10^{-3}	6.3×10^{-4}	5.5×10^{-4}	4.7×10^{-4}	2.6×10^{-4}	1.3×10^{-4}	<0.001
1,2,4-Trichlorobenzene	24 Hour	1,850	-	6.4×10^{-12}	4.7×10^{-12}	8.8×10^{-12}	4.6×10^{-12}	1.2×10^{-11}	7.8×10^{-12}	6.0×10^{-9}	-	<0.001
1,1,1-Trichloroethane (methyl chloroform)	24 Hour	95,500	7.3×10^{-6}	1.2×10^{-5}	4.8×10^{-5}	5.8×10^{-5}	2.4×10^{-5}	2.1×10^{-5}	1.8×10^{-5}	9.9×10^{-6}	4.9×10^{-6}	<0.001
Vanadium	24 Hour	3	9.9×10^{-4}	2.0×10^{-3}	7.0×10^{-3}	8.0×10^{-3}	3.0×10^{-3}	3.0×10^{-3}	2.0×10^{-3}	1.0×10^{-3}	6.6×10^{-4}	0.3
Xylene	24 Hour	21,750	3.4×10^{-6}	5.5×10^{-6}	2.2×10^{-5}	2.7×10^{-5}	1.1×10^{-5}	9.7×10^{-6}	8.2×10^{-6}	4.5×10^{-6}	2.3×10^{-6}	<0.001
Zinc	24 Hour	500	9.0×10^{-4}	1.0×10^{-3}	6.0×10^{-3}	7.0×10^{-3}	3.0×10^{-3}	3.0×10^{-3}	2.0×10^{-3}	1.0×10^{-3}	6.0×10^{-4}	0.001
Maximum Concentrations (micrograms per cubic meter) at Craters of the Moon Carcinogens												
Acetaldehyde	Annual	0.45	-	3.8×10^{-10}	3.0×10^{-12}	3.8×10^{-10}	3.0×10^{-12}	3.8×10^{-10}	3.8×10^{-10}	2.8×10^{-12}	-	<0.001
Arsenic	Annual	2.3×10^{-4}	7.6×10^{-8}	1.2×10^{-7}	4.9×10^{-7}	5.9×10^{-7}	2.5×10^{-7}	2.1×10^{-7}	1.8×10^{-7}	1.0×10^{-7}	5.0×10^{-8}	0.3
Benzene	Annual	0.12	1.2×10^{-8}	2.0×10^{-8}	7.9×10^{-8}	9.6×10^{-8}	4.0×10^{-8}	3.5×10^{-8}	3.0×10^{-8}	1.7×10^{-8}	8.0×10^{-9}	<0.001
Benzo(a)pyrene	Annual	3.0×10^{-4}	-	2.6×10^{-12}	5.2×10^{-14}	2.6×10^{-12}	5.2×10^{-14}	2.7×10^{-12}	2.6×10^{-12}	1.3×10^{-9}	-	<0.001
Beryllium	Annual	0.004	1.6×10^{-9}	2.6×10^{-9}	1.0×10^{-8}	1.2×10^{-8}	5.2×10^{-9}	4.5×10^{-9}	3.8×10^{-9}	2.1×10^{-9}	1.0×10^{-9}	<0.001
1,3-Butadiene	Annual	0.004	-	1.9×10^{-11}	1.5×10^{-13}	2.0×10^{-11}	1.5×10^{-13}	2.0×10^{-11}	1.9×10^{-11}	1.4×10^{-13}	-	<0.001
Cadmium	Annual	5.6×10^{-4}	2.3×10^{-8}	3.7×10^{-8}	1.5×10^{-7}	1.8×10^{-7}	7.4×10^{-8}	6.5×10^{-8}	5.5×10^{-8}	3.0×10^{-8}	1.5×10^{-8}	0.03
Carbon tetrachloride	Annual	0.067	-	1.2×10^{-12}	4.9×10^{-15}	1.2×10^{-12}	4.9×10^{-15}	1.2×10^{-12}	1.2×10^{-12}	6.4×10^{-10}	-	<0.001
Chloroform	Annual	0.043	-	1.2×10^{-12}	4.9×10^{-15}	1.2×10^{-12}	4.9×10^{-15}	1.2×10^{-12}	1.2×10^{-12}	6.4×10^{-10}	-	<0.001

Table C.2-17. Concentrations of toxic air pollutants (micrograms per cubic meters) at ambient air locations under waste processing alternatives (continued).

Pollutant	Averaging time	Idaho Standard (micrograms per cubic meter) ^a	Separations Alternative				Non-Separations Alternative				Minimum INEEL Processing Alternative	Maximum concentration as a percent of standard	
			No Action Alternative	Continued Current Operations Alternative	Full Separations Option	Planning Basis Option	Transuranic Separations Option	Hot Isostatic Pressed Waste Option	Direct Cement Waste Option	Early Vitrification Option			
			Maximum Concentrations (micrograms per cubic meter) at Craters of the Moon Carcinogens (continued)										
Chromium (hexavalent)	Annual	8.3×10^{-5}	1.4×10^{-8}	2.3×10^{-8}	9.2×10^{-8}	1.1×10^{-7}	4.6×10^{-8}	4.0×10^{-8}	3.4×10^{-8}	1.9×10^{-8}	9.3×10^{-9}	0.1	
1,2-Dichloroethane	Annual	0.038	-	1.2×10^{-12}	4.9×10^{-15}	1.2×10^{-12}	4.9×10^{-15}	1.2×10^{-12}	1.2×10^{-12}	6.4×10^{-10}	-	<0.001	
Dioxins and furans	Annual	2.2×10^{-8}	-	2.9×10^{-14}	5.6×10^{-16}	2.9×10^{-14}	5.6×10^{-16}	3.0×10^{-14}	2.9×10^{-14}	5.2×10^{-16}	-	<0.001	
Formaldehyde	Annual	0.077	1.9×10^{-6}	3.0×10^{-6}	1.2×10^{-5}	1.5×10^{-5}	6.1×10^{-6}	5.4×10^{-6}	4.5×10^{-6}	2.5×10^{-6}	1.2×10^{-6}	0.02	
Hydrazine	Annual	3.4×10^{-4}	-	4.2×10^{-11}	3.4×10^{-13}	4.3×10^{-11}	3.4×10^{-13}	4.3×10^{-11}	4.3×10^{-11}	2.2×10^{-8}	-	0.007	
Methylene chloride	Annual	0.28	-	1.2×10^{-12}	4.9×10^{-15}	1.2×10^{-12}	4.9×10^{-15}	1.2×10^{-12}	1.2×10^{-12}	6.4×10^{-10}	-	<0.001	
Nickel	Annual	0.004	4.8×10^{-6}	7.8×10^{-6}	3.1×10^{-5}	3.8×10^{-5}	1.6×10^{-5}	1.4×10^{-5}	1.2×10^{-5}	6.4×10^{-6}	3.2×10^{-6}	1.0	
Polycyclic aromatic hydrocarbons	Annual	3.0×10^{-4}	3.6×10^{-9}	5.7×10^{-9}	2.3×10^{-8}	2.8×10^{-8}	1.2×10^{-8}	1.0×10^{-8}	8.5×10^{-9}	4.7×10^{-9}	2.3×10^{-9}	0.009	
Paradioxane	Annual	0.71	-	-	-	-	-	-	-	-	-	<0.001	
Perchloroethylene	Annual	0.014	-	1.2×10^{-12}	4.9×10^{-15}	1.2×10^{-12}	4.9×10^{-15}	1.2×10^{-12}	1.2×10^{-12}	6.4×10^{-10}	-	<0.001	
Thiourea	Annual	0.002	-	5.2×10^{-14}	2.0×10^{-12}	1.9×10^{-12}	2.0×10^{-12}	4.4×10^{-12}	1.1×10^{-12}	2.9×10^{-11}	-	<0.001	
1,1,2-Trichloroethane	Annual	0.062	-	1.2×10^{-12}	9.8×10^{-15}	1.2×10^{-12}	9.8×10^{-15}	1.2×10^{-12}	1.2×10^{-12}	6.4×10^{-10}	-	<0.001	
Trichloroethylene	Annual	0.077	-	1.2×10^{-12}	9.8×10^{-15}	1.2×10^{-12}	9.8×10^{-15}	1.2×10^{-12}	1.2×10^{-12}	6.4×10^{-10}	-	<0.001	
Noncarcinogens													
Acetonitrile	24 Hour	3,350	-	1.8×10^{-10}	4.5×10^{-13}	1.8×10^{-10}	4.6×10^{-13}	1.8×10^{-10}	1.8×10^{-10}	5.4×10^{-8}	-	<0.001	
Acrolein	24 Hour	13	-	6.8×10^{-10}	3.5×10^{-12}	6.9×10^{-10}	3.5×10^{-12}	6.9×10^{-10}	6.8×10^{-10}	2.9×10^{-12}	-	<0.001	
Antimony	24 Hour	25	4.9×10^{-6}	8.0×10^{-6}	3.2×10^{-5}	3.9×10^{-5}	1.6×10^{-5}	1.4×10^{-5}	1.2×10^{-5}	6.5×10^{-6}	3.3×10^{-6}	<0.001	
Barium	24 Hour	25	2.4×10^{-6}	3.9×10^{-6}	1.6×10^{-5}	1.9×10^{-5}	7.8×10^{-6}	6.8×10^{-6}	5.8×10^{-6}	3.2×10^{-6}	1.6×10^{-6}	<0.001	
Bromoform	24 Hour	250	-	1.8×10^{-11}	4.7×10^{-14}	1.8×10^{-11}	4.7×10^{-14}	1.8×10^{-11}	1.8×10^{-11}	5.6×10^{-9}	-	<0.001	
Carbon disulfide	24 Hour	1,500	-	1.5×10^{-9}	7.6×10^{-12}	1.5×10^{-9}	7.7×10^{-12}	1.6×10^{-9}	1.5×10^{-9}	4.6×10^{-7}	-	<0.001	
Chloride	24 Hour	150	3.2×10^{-4}	8.9×10^{-4}	2.0×10^{-3}	3.0×10^{-3}	1.0×10^{-3}	1.0×10^{-3}	1.0×10^{-3}	7.3×10^{-4}	3.2×10^{-4}	0.002	
Chlorobenzene	24 Hour	17,500	-	1.8×10^{-11}	4.7×10^{-14}	1.8×10^{-11}	4.7×10^{-14}	1.8×10^{-11}	1.8×10^{-11}	5.6×10^{-9}	-	<0.001	
Chromium (total)	24 Hour	25	7.9×10^{-7}	1.3×10^{-6}	5.1×10^{-6}	6.2×10^{-6}	2.6×10^{-6}	2.3×10^{-6}	1.9×10^{-6}	1.0×10^{-6}	5.3×10^{-7}	<0.001	
Cobalt	24 Hour	3	5.6×10^{-6}	9.1×10^{-6}	3.7×10^{-5}	4.4×10^{-5}	1.8×10^{-5}	1.6×10^{-5}	1.4×10^{-5}	7.4×10^{-6}	3.7×10^{-6}	0.002	
Copper	24 Hour	10	1.6×10^{-6}	2.7×10^{-6}	1.1×10^{-5}	1.3×10^{-5}	5.4×10^{-6}	4.7×10^{-6}	4.0×10^{-6}	2.2×10^{-6}	1.1×10^{-6}	<0.001	
Diethyl phthalate	24 Hour	250	-	5.0×10^{-12}	6.4×10^{-14}	5.1×10^{-12}	6.4×10^{-14}	5.2×10^{-12}	5.0×10^{-12}	1.5×10^{-9}	-	<0.001	
Di-n-butyl phthalate	24 Hour	250	-	7.1×10^{-13}	9.1×10^{-15}	7.2×10^{-13}	9.1×10^{-15}	7.4×10^{-13}	7.2×10^{-13}	2.1×10^{-10}	-	<0.001	
Di-n-octyl phthalate	24 Hour	250	-	7.1×10^{-15}	2.3×10^{-12}	3.1×10^{-10}	2.3×10^{-12}	3.1×10^{-10}	3.1×10^{-10}	9.3×10^{-8}	-	<0.001	
2,4-Dinitrophenol	24 Hour	-	-	3.1×10^{-10}	1.8×10^{-13}	2.7×10^{-13}	1.8×10^{-13}	6.0×10^{-13}	1.5×10^{-13}	2.3×10^{-12}	-	-	
Ethyl benzene	24 Hour	22,000	6.1×10^{-8}	1.0×10^{-7}	4.0×10^{-7}	4.8×10^{-7}	2.0×10^{-7}	1.7×10^{-7}	1.5×10^{-7}	8.1×10^{-8}	4.1×10^{-8}	<0.001	
Fluoride	24 Hour	125	3.5×10^{-5}	8.5×10^{-4}	2.4×10^{-4}	1.0×10^{-3}	1.3×10^{-4}	8.9×10^{-4}	8.8×10^{-4}	5.6×10^{-4}	2.3×10^{-5}	<0.001	
Lead	24 Hour	-	1.4×10^{-6}	2.3×10^{-6}	9.2×10^{-6}	1.1×10^{-5}	4.6×10^{-6}	4.0×10^{-6}	3.4×10^{-6}	1.9×10^{-6}	9.4×10^{-7}	-	
Manganese	24 Hour	50	2.8×10^{-6}	4.6×10^{-6}	1.8×10^{-5}	2.2×10^{-5}	9.2×10^{-6}	8.0×10^{-6}	6.8×10^{-6}	3.7×10^{-6}	1.9×10^{-6}	<0.001	
Mercury	24 Hour	5	1.1×10^{-7}	1.9×10^{-7}	1.1×10^{-6}	1.6×10^{-6}	8.7×10^{-7}	2.0×10^{-6}	6.8×10^{-7}	5.2×10^{-7}	7.0×10^{-8}	<0.001	
Methyl ethyl ketone	24 Hour	29,500	-	6.4×10^{-10}	1.6×10^{-12}	6.4×10^{-10}	1.6×10^{-12}	6.4×10^{-10}	6.4×10^{-10}	2.0×10^{-7}	-	<0.001	
Molybdenum	24 Hour	250	7.3×10^{-7}	1.2×10^{-6}	4.8×10^{-6}	5.8×10^{-6}	2.4×10^{-6}	2.1×10^{-6}	1.8×10^{-6}	9.7×10^{-7}	4.9×10^{-7}	<0.001	
Naphthalene	24 Hour	2,500	1.1×10^{-6}	1.7×10^{-6}	6.9×10^{-6}	8.3×10^{-6}	3.4×10^{-6}	3.0×10^{-6}	2.5×10^{-6}	1.4×10^{-6}	7.0×10^{-7}	<0.001	

Table C.2-17. Concentrations of toxic air pollutants (micrograms per cubic meters) at ambient air locations under waste processing alternatives (continued).

Pollutant	Averaging time	Idaho Standard (micrograms per cubic meter) ^a	Separations Alternative				Non-Separations Alternative				Minimum INEEL Processing Alternative	Maximum concentration as a percent of standard
			No Action Alternative	Continued Current Operations Alternative	Full Separations Option	Planning Basis Option	Transuranic Separations Option	Hot Isostatic Pressed Waste Option	Direct Cement Waste Option	Early Vitrification Option		
Maximum Concentrations (micrograms per cubic meter) at Craters of the Moon Noncarcinogens (continued)												
Pentachlorophenol	24 Hour	25	-	3.7×10^{-11}	4.8×10^{-13}	3.8×10^{-11}	4.8×10^{-13}	3.9×10^{-11}	3.8×10^{-11}	1.1×10^{-8}	-	<0.001
Phenol	24 Hour	950	-	6.4×10^{-10}	8.5×10^{-12}	6.5×10^{-10}	8.5×10^{-12}	6.6×10^{-10}	6.4×10^{-10}	2.0×10^{-7}	-	<0.001
Phosphorus	24 Hour	5	8.8×10^{-6}	1.4×10^{-5}	5.8×10^{-5}	6.9×10^{-5}	2.9×10^{-5}	2.5×10^{-5}	2.1×10^{-5}	1.2×10^{-5}	5.9×10^{-6}	0.001
Propylene (propene)	24 Hour	-	-	1.9×10^{-8}	9.6×10^{-11}	2.0×10^{-8}	9.7×10^{-11}	2.0×10^{-8}	2.0×10^{-8}	8.1×10^{-11}	-	-
Pyridine	24 Hour	750	-	5.4×10^{-8}	6.9×10^{-10}	5.5×10^{-8}	7.0×10^{-10}	5.7×10^{-8}	5.5×10^{-8}	1.7×10^{-5}	-	<0.001
Selenium	24 Hour	10	6.3×10^{-7}	1.0×10^{-6}	4.2×10^{-6}	5.0×10^{-6}	2.1×10^{-6}	1.8×10^{-6}	1.5×10^{-6}	8.4×10^{-7}	4.3×10^{-7}	<0.001
Silver	24 Hour	5	-	-	5.1×10^{-12}	7.4×10^{-12}	5.1×10^{-12}	1.7×10^{-11}	8.1×10^{-16}	4.2×10^{-12}	5.8×10^{-13}	<0.001
Thallium	24 Hour	5	-	6.1×10^{-12}	1.5×10^{-11}	2.8×10^{-11}	1.6×10^{-11}	5.9×10^{-11}	6.1×10^{-12}	1.7×10^{-11}	-	<0.001
Toluene	24 Hour	18,750	5.8×10^{-6}	9.4×10^{-6}	3.8×10^{-5}	4.6×10^{-5}	1.9×10^{-5}	1.7×10^{-5}	1.4×10^{-5}	7.7×10^{-6}	3.9×10^{-6}	<0.001
1,2,4-Trichlorobenzene	24 Hour	1,850	-	1.1×10^{-12}	2.9×10^{-13}	1.5×10^{-12}	2.9×10^{-13}	2.1×10^{-12}	1.4×10^{-12}	3.4×10^{-10}	-	<0.001
1,1,1-Trichloroethane (Methyl chloroform)	24 Hour	95,500	2.2×10^{-7}	3.6×10^{-7}	1.4×10^{-6}	1.7×10^{-6}	7.2×10^{-7}	6.3×10^{-7}	5.3×10^{-7}	3.0×10^{-7}	1.5×10^{-7}	<0.001
Vanadium	24 Hour	3	3.0×10^{-5}	4.8×10^{-5}	1.9×10^{-4}	2.3×10^{-4}	9.7×10^{-5}	8.5×10^{-5}	7.2×10^{-5}	3.9×10^{-5}	2.0×10^{-5}	0.009
Xylene	24 Hour	21,750	1.0×10^{-7}	1.7×10^{-7}	6.6×10^{-7}	8.0×10^{-7}	3.3×10^{-7}	2.9×10^{-7}	2.5×10^{-7}	1.3×10^{-7}	6.8×10^{-8}	<0.001
Zinc	24 Hour	500	2.7×10^{-5}	4.4×10^{-5}	1.8×10^{-4}	2.1×10^{-4}	8.9×10^{-5}	7.7×10^{-5}	6.6×10^{-5}	3.6×10^{-5}	1.8×10^{-5}	<0.001

a. Applicable ambient air standards are specified in IDHW (1997) for carcinogenic air pollutants and noncarcinogenic toxic air pollutant increments. It should be noted that these standards apply only to new sources; for existing sources, they are used here as reference values for purposes of comparison.

b. Carcinogenic impacts are not evaluated at public highways.

Table C.2-18. Concentrations of toxic air pollutants at major INEEL facility areas from emissions under waste processing alternatives.

Occupational Exposure Limit (micrograms per cubic meter) ^a	No Action Alternative	Continued Current Operations Alternative	Separations Alternative			Non-Separations Alternative			Minimum INEEL Processing Alternative	Maximum concentration as a percent of standard				
			Full Separations Option	Planning Basis Option	Transuranic Separations Option	Hot Isostatic Pressed Waste Option	Direct Cement Waste Option	Early Vitrification Option						
Maximum Onsite Concentrations (micrograms per cubic meter)^b														
Carcinogens														
Acetaldehyde	45,000	-	2.2×10 ⁻⁷	3.0×10 ⁻⁹	2.2×10 ⁻⁷	2.4×10 ⁻⁹	2.2×10 ⁻⁷	2.2×10 ⁻⁷	1.6×10 ⁻⁹	-<0.001				
Arsenic	10	4.9×10 ⁻⁴	2.0×10 ⁻³	5.0×10 ⁻³	6.0×10 ⁻³	3.0×10 ⁻³	2.0×10 ⁻³	2.0×10 ⁻³	6.6×10 ⁻⁴	1.0×10 ⁻³ 0.06				
Benzene	3,000	7.9×10 ⁻⁵	3.2×10 ⁻⁴	7.6×10 ⁻⁴	9.4×10 ⁻⁴	5.2×10 ⁻⁴	3.6×10 ⁻⁴	3.5×10 ⁻⁴	1.1×10 ⁻⁴	1.6×10 ⁻⁴ <0.001				
Benzo(a)pyrene	200	-	1.5×10 ⁻⁹	5.3×10 ⁻¹¹	1.5×10 ⁻⁹	4.2×10 ⁻¹¹	1.6×10 ⁻⁹	1.5×10 ⁻⁹	7.5×10 ⁻⁷	-<0.001				
Beryllium	2	1.0×10 ⁻⁵	4.2×10 ⁻⁵	9.8×10 ⁻⁵	1.2×10 ⁻⁴	6.8×10 ⁻⁵	4.6×10 ⁻⁵	4.5×10 ⁻⁵	1.4×10 ⁻⁵	2.1×10 ⁻⁵ 0.006				
1,3-Butadiene	4,400	-	1.1×10 ⁻⁸	1.5×10 ⁻¹⁰	1.1×10 ⁻⁸	1.2×10 ⁻¹⁰	1.2×10 ⁻⁸	1.1×10 ⁻⁸	8.2×10 ⁻¹¹	-<0.001				
Cadmium	2	1.5×10 ⁻⁴	6.0×10 ⁻⁴	1.0×10 ⁻³	2.0×10 ⁻³	1.0×10 ⁻³	6.6×10 ⁻⁴	6.5×10 ⁻⁴	2.0×10 ⁻⁴	3.0×10 ⁻⁴ 0.09				
Carbon tetrachloride	12,600	-	7.0×10 ⁻¹⁰	5.0×10 ⁻¹²	7.0×10 ⁻¹⁰	4.0×10 ⁻¹²	7.1×10 ⁻¹⁰	7.0×10 ⁻¹⁰	3.8×10 ⁻⁷	-<0.001				
Chloroform	9,780	-	7.0×10 ⁻¹⁰	5.0×10 ⁻¹²	7.0×10 ⁻¹⁰	4.0×10 ⁻¹²	7.1×10 ⁻¹⁰	7.0×10 ⁻¹⁰	3.8×10 ⁻⁷	-<0.001				
Chromium (hexavalent)	50	9.2×10 ⁻⁵	3.7×10 ⁻⁴	8.8×10 ⁻⁴	1.0×10 ⁻³	6.0×10 ⁻⁴	4.1×10 ⁻⁴	4.0×10 ⁻⁴	1.2×10 ⁻⁴	1.9×10 ⁻⁴ 0.002				
1,2-Dichloroethane	4,000	-	7.0×10 ⁻¹⁰	5.0×10 ⁻¹²	7.0×10 ⁻¹⁰	4.0×10 ⁻¹²	7.1×10 ⁻¹⁰	7.0×10 ⁻¹⁰	3.8×10 ⁻⁷	-<0.001				
Dioxins and furans	ALARA	-	1.7×10 ⁻¹¹	5.7×10 ⁻¹³	1.7×10 ⁻¹¹	4.6×10 ⁻¹³	1.7×10 ⁻¹¹	1.7×10 ⁻¹¹	3.1×10 ⁻¹³	- -				
Formaldehyde	925	0.01	0.05	0.12	0.15	0.08	0.05	0.05	0.02	0.03 0.02				
Hydrazine	100	-	2.5×10 ⁻⁸	3.4×10 ⁻¹⁰	2.5×10 ⁻⁸	2.8×10 ⁻¹⁰	2.5×10 ⁻⁸	2.5×10 ⁻⁸	1.3×10 ⁻⁵	-<0.001				
Methylene chloride	174,000	-	7.0×10 ⁻¹⁰	5.0×10 ⁻¹²	7.0×10 ⁻¹⁰	4.0×10 ⁻¹²	7.1×10 ⁻¹⁰	7.0×10 ⁻¹⁰	3.8×10 ⁻⁷	-<0.001				
Nickel	100	0.03	0.13	0.30	0.37	0.21	0.14	0.14	0.04	0.06 0.4				
Polycyclic aromatic hydrocarbons	200	2.3×10 ⁻⁵	9.4×10 ⁻⁵	2.2×10 ⁻⁴	2.7×10 ⁻⁴	1.5×10 ⁻⁴	1.0×10 ⁻⁴	1.0×10 ⁻⁴	3.1×10 ⁻⁵	4.8×10 ⁻⁵ <0.001				
Paradioxane	90,000	-	-	-	-	-	-	-	-	<0.001				
Perchloroethylene	170,000	-	7.0×10 ⁻¹⁰	5.0×10 ⁻¹²	7.0×10 ⁻¹⁰	4.0×10 ⁻¹²	7.1×10 ⁻¹⁰	7.0×10 ⁻¹⁰	3.8×10 ⁻⁷	-<0.001				
Thiourea	-	-	3.0×10 ⁻¹¹	2.0×10 ⁻⁹	1.1×10 ⁻⁹	1.6×10 ⁻⁹	2.6×10 ⁻⁹	6.2×10 ⁻¹⁰	1.7×10 ⁻⁸	- -				
1,1,2-Trichloroethane	45,000	-	7.0×10 ⁻¹⁰	9.9×10 ⁻¹²	7.1×10 ⁻¹⁰	8.0×10 ⁻¹²	7.1×10 ⁻¹⁰	7.0×10 ⁻¹⁰	3.8×10 ⁻⁷	-<0.001				
Trichloroethylene	269,000	-	7.0×10 ⁻¹⁰	9.9×10 ⁻¹²	7.1×10 ⁻¹⁰	8.0×10 ⁻¹²	7.1×10 ⁻¹⁰	7.0×10 ⁻¹⁰	3.8×10 ⁻⁷	-<0.001				
Acetonitrile	70,000	-	7.0×10 ⁻⁹	4.8×10 ⁻¹¹	7.0×10 ⁻⁹	3.8×10 ⁻¹¹	7.1×10 ⁻⁹	7.0×10 ⁻⁹	3.6×10 ⁻⁶	-<0.001				
Acrolein	250	-	2.6×10 ⁻⁸	3.6×10 ⁻¹⁰	2.7×10 ⁻⁸	2.9×10 ⁻¹⁰	2.7×10 ⁻⁸	2.7×10 ⁻⁸	1.9×10 ⁻¹⁰	-<0.001				
Antimony	500	2.0×10 ⁻³	8.0×10 ⁻³	0.02	0.02	0.01	9.0×10 ⁻³	9.0×10 ⁻³	3.0×10 ⁻³	4.0×10 ⁻³ 0.005				
Barium	500	9.5×10 ⁻⁴	4.0×10 ⁻³	9.0×10 ⁻³	0.01	6.0×10 ⁻³	4.0×10 ⁻³	4.0×10 ⁻³	1.0×10 ⁻³	2.0×10 ⁻³ 0.002				
Bromoform	5,000	-	7.0×10 ⁻¹⁰	5.0×10 ⁻¹²	7.0×10 ⁻¹⁰	4.0×10 ⁻¹²	7.1×10 ⁻¹⁰	7.0×10 ⁻¹⁰	3.8×10 ⁻⁷	-<0.001				
Carbon disulfide	12,000	-	5.9×10 ⁻⁸	8.0×10 ⁻¹⁰	6.0×10 ⁻⁸	6.4×10 ⁻¹⁰	6.0×10 ⁻⁸	6.0×10 ⁻⁸	3.1×10 ⁻⁵	-<0.001				
Chloride	1,500	0.13	0.52	1.2	1.5	0.8	0.58	0.56	0.18	0.27 0.1				
Chlorobenzene	46,000	-	7.0×10 ⁻¹⁰	5.0×10 ⁻¹²	7.0×10 ⁻¹⁰	4.0×10 ⁻¹²	7.1×10 ⁻¹⁰	7.0×10 ⁻¹⁰	3.8×10 ⁻⁷	-<0.001				

Table C.2-18. (continued).

Occupational Exposure Limit (micrograms per cubic meter) ^a	No Action Alternative	Continued Current Operations Alternative	Separations Alternative			Non-Separations Alternative			Minimum INEEL Processing Alternative	Maximum concentration as a percent of standard				
			Full Separations Option	Planning Basis Option	Transuranic Separations Option	Hot Isostatic Pressed Waste Option	Direct Cement Waste Option	Early Vitrification Option						
Maximum Onsite Concentrations (micrograms per cubic meter) (continued)														
Noncarcinogens														
Chromium (total)	500	3.1×10^{-4}	1.0×10^{-3}	3.0×10^{-3}	4.0×10^{-3}	2.0×10^{-3}	1.0×10^{-3}	1.0×10^{-3}	4.2×10^{-4}	6.5×10^{-4}				
Cobalt	20	2.0×10^{-3}	9.0×10^{-3}	0.02	0.03	0.01	0.01	0.01	3.0×10^{-3}	5.0×10^{-3}				
Copper	100	6.5×10^{-4}	3.0×10^{-3}	6.0×10^{-3}	8.0×10^{-3}	4.0×10^{-3}	3.0×10^{-3}	3.0×10^{-3}	1.0×10^{-3}	1.0×10^{-3}				
Diethyl phthalate	5,000	-	1.9×10^{-10}	6.7×10^{-12}	2.0×10^{-10}	5.4×10^{-12}	2.0×10^{-10}	2.0×10^{-10}	1.0×10^{-7}	-				
Di-n-butyl phthalate	5,000	-	2.7×10^{-11}	9.5×10^{-13}	2.8×10^{-11}	7.7×10^{-13}	2.9×10^{-11}	2.8×10^{-11}	1.4×10^{-8}	<0.001				
Di-n-octyl phthalate	5,000	-	2.7×10^{-13}	2.4×10^{-10}	1.2×10^{-8}	2.0×10^{-10}	1.2×10^{-8}	1.2×10^{-8}	6.3×10^{-6}	-				
2,4-Dinitrophenol	-	-	1.2×10^{-8}	1.9×10^{-11}	1.1×10^{-11}	1.5×10^{-11}	2.3×10^{-11}	5.7×10^{-12}	1.5×10^{-10}	-				
Ethyl benzene	430,000	2.4×10^{-5}	9.9×10^{-5}	2.3×10^{-4}	2.9×10^{-4}	1.6×10^{-4}	1.1×10^{-4}	1.1×10^{-4}	3.3×10^{-5}	5.0×10^{-5}				
Fluoride	2,500	0.01	0.06	0.13	0.16	0.09	0.06	0.06	0.05	0.03				
Lead	50	5.6×10^{-4}	2.0×10^{-3}	5.0×10^{-3}	7.0×10^{-3}	4.0×10^{-3}	3.0×10^{-3}	2.0×10^{-3}	7.5×10^{-4}	1.0×10^{-3}				
Manganese	200	1.0×10^{-3}	5.0×10^{-3}	0.01	0.01	0.01	5.0×10^{-3}	5.0×10^{-3}	1.0×10^{-3}	2.0×10^{-3}				
Mercury	25	4.2×10^{-5}	1.7×10^{-4}	4.2×10^{-4}	5.0×10^{-4}	2.9×10^{-4}	1.9×10^{-4}	1.8×10^{-4}	6.8×10^{-5}	8.7×10^{-5}				
Methyl ethyl ketone	590,000	-	2.5×10^{-8}	1.7×10^{-10}	2.5×10^{-8}	1.4×10^{-10}	2.5×10^{-8}	2.5×10^{-8}	1.3×10^{-5}	-				
Molybdenum	5,000	2.9×10^{-4}	1.0×10^{-3}	3.0×10^{-3}	3.0×10^{-3}	2.0×10^{-3}	1.0×10^{-3}	1.0×10^{-3}	3.9×10^{-4}	6.0×10^{-4}				
Naphthalene	50,000	4.2×10^{-4}	2.0×10^{-3}	4.0×10^{-3}	5.0×10^{-3}	3.0×10^{-3}	2.0×10^{-3}	2.0×10^{-3}	5.6×10^{-4}	8.7×10^{-4}				
Pentachlorophenol	500	-	1.5×10^{-9}	5.1×10^{-11}	1.5×10^{-9}	4.1×10^{-11}	1.5×10^{-9}	1.5×10^{-9}	7.5×10^{-7}	-				
Phenol	19,000	-	2.5×10^{-8}	8.9×10^{-10}	2.5×10^{-8}	7.2×10^{-10}	2.6×10^{-8}	2.5×10^{-8}	1.3×10^{-5}	-				
Phosphorus	100	4.0×10^{-3}	0.01	0.03	0.04	0.02	0.02	0.02	5.0×10^{-3}	7.0×10^{-3}				
Propylene (propene)	-	-	7.5×10^{-7}	1.0×10^{-8}	7.6×10^{-7}	8.1×10^{-9}	7.7×10^{-7}	7.6×10^{-7}	5.5×10^{-9}	-				
Pyridine	15,000	-	2.1×10^{-6}	7.3×10^{-8}	2.1×10^{-6}	5.9×10^{-8}	2.2×10^{-6}	2.1×10^{-6}	0.001	-				
Selenium	200	2.5×10^{-4}	1.0×10^{-3}	2.0×10^{-3}	3.0×10^{-3}	2.0×10^{-3}	1.0×10^{-3}	1.0×10^{-3}	3.4×10^{-4}	5.2×10^{-4}				
Silver	10	-	-	5.4×10^{-10}	2.9×10^{-10}	4.3×10^{-10}	6.5×10^{-10}	3.1×10^{-14}	2.8×10^{-10}	3.8×10^{-11}				
Thallium	100	-	2.4×10^{-10}	1.6×10^{-9}	1.1×10^{-9}	1.3×10^{-9}	2.3×10^{-9}	2.4×10^{-10}	1.2×10^{-9}	-				
Toluene	188,000	2.0×10^{-3}	9.0×10^{-3}	0.02	0.03	0.02	0.01	0.01	3.0×10^{-3}	5.0×10^{-3}				
1,2,4-Trichlorobenzene	-	-	4.4×10^{-11}	3.0×10^{-11}	6.0×10^{-11}	2.4×10^{-11}	8.1×10^{-11}	5.3×10^{-11}	2.3×10^{-8}	-				
1,1,1-Trichloroethane	1,900,000	8.7×10^{-5}	3.6×10^{-4}	8.3×10^{-4}	1.0×10^{-3}	5.7×10^{-4}	3.9×10^{-4}	3.8×10^{-4}	1.2×10^{-4}	1.8×10^{-4}				
(methyl chloroform)	Vanadium	50	0.01	0.05	0.11	0.14	0.08	0.05	0.05	0.02				
Xylene	434,000	4.0×10^{-5}	1.6×10^{-4}	3.9×10^{-4}	4.8×10^{-4}	2.7×10^{-4}	1.8×10^{-4}	1.8×10^{-4}	5.4×10^{-5}	8.3×10^{-5}				
Zinc	5,000	0.01	0.04	0.10	0.13	0.07	0.05	0.05	0.01	0.02				

a. 8-hour time-weighted average recommended by either the American Conference of Governmental Industrial Hygienists or the Occupational Safety and Health Administration (the more restrictive of the two is used).

b. Location of highest 8-hour level is within INTEC.
ALAR = as low as reasonably achievable.

Table C.2-19. Results of visibility screening analysis for waste processing alternatives.

Case	Color shift (delta E) parameter				Contrast parameter			
	Sky		Terrain		Sky		Terrain	
	View 1	View 2	View 1	View 2	View 1	View 2	View 1	View 2
Maximum acceptable screening value	2.0	2.0	2.0	2.0	0.05	0.05	0.05	0.05
Craters of the Moon Wilderness Area								
No Action Alternative	0.04	0.02	0.04	0.006	-	-	-	-
Continued Current Operations Alternative	0.16	0.12	0.09	0.03	-	-0.001	0.001	-
Separations Alternative								
Full Separations	0.33	0.23	0.31	0.06	0.001	-0.003	0.002	-
Planning Basis Option	0.47	0.33	0.37	0.09	0.001	-0.004	0.003	-
Transuranic Separations	0.21	0.15	0.16	0.04	-	-0.002	0.001	-
Non-Separations Alternative								
Hot Isostatic Pressed Waste Option	0.48	0.34	0.16	0.09	-0.001	-0.003	0.001	-
Direct Cement Waste Option	0.19	0.14	0.12	0.04	-	-0.001	0.001	-
Early Vitrification Option	0.06	0.05	0.06	0.01	-	-	-	-
Minimum INEEL Processing Alternative	0.03	0.02	0.04	0.006	-	-	-	-
Fort Hall Indian Reservation								
No Action Alternative	0.02	0.01	0.02	0.003	-	-	-	-
Continued Current Operations Alternative	0.07	0.05	0.04	0.02	-	-	-	-
Separations Alternative								
Full Separations	0.14	0.10	0.12	0.03	0.001	-0.001	0.001	-
Planning Basis Option	0.20	0.14	0.15	0.05	-	-0.002	0.001	-
Transuranic Separations	0.09	0.06	0.07	0.02	-	-0.001	0.001	-
Non-Separations Alternative								
Hot Isostatic Pressed Waste Option	0.21	0.15	0.07	0.05	-0.001	-0.001	0.001	-
Direct Cement Waste Option	0.08	0.06	0.05	0.02	-	-0.001	-	-
Early Vitrification Option	0.03	0.02	0.02	0.006	-	-	-	-
Minimum INEEL Processing Alternative	0.02	0.009	0.02	0.003	-	-	-	-

Table C.2-20. Airborne radionuclide emissions estimates for dispositioning proposed facilities associated with waste processing alternatives.

Project number	Description	Duration (years)	Annual emission rate and total project emissions ^a					
			Total radioactivity (curies per year) (curies)		Strontium-90/Yttrium-90 (curies per year) (curies)		Cesium-137 (curies per year) (curies)	
			No Action					
P1D	No Action Alternative	-	-	-	-	-	-	-
Continued Current Operations Alternative								
P1A	Calcine SBW including NWCF Upgrades (MACT)	3	1.2×10^{-7}	1.7×10^{-7}	1.0×10^{-7}	1.6×10^{-7}	1.2×10^{-8}	1.8×10^{-8}
P1B	NGLWM and TF Waste Heel Waste	1	5.8×10^{-8}	5.8×10^{-8}	5.2×10^{-8}	5.2×10^{-8}	6.0×10^{-9}	6.0×10^{-9}
Totals			1.2×10^{-7}	2.3×10^{-7}	1.0×10^{-7}	2.1×10^{-7}	1.2×10^{-8}	2.4×10^{-8}
Full Separations Option^b								
P59A	Calcine Retrieval and Transport	1	5.8×10^{-8}	5.8×10^{-8}	5.2×10^{-8}	5.2×10^{-8}	6.0×10^{-9}	6.0×10^{-9}
P9A	Full (early) Separations	3	5.8×10^{-8}	1.7×10^{-7}	5.2×10^{-8}	1.6×10^{-7}	6.0×10^{-9}	1.8×10^{-8}
P9B	Vitrification Plant	3	5.8×10^{-8}	1.7×10^{-7}	5.2×10^{-8}	1.6×10^{-7}	6.0×10^{-9}	1.8×10^{-8}
P9C	Class A Grout Plant	3	5.8×10^{-8}	1.7×10^{-7}	5.2×10^{-8}	1.6×10^{-7}	6.0×10^{-9}	1.8×10^{-8}
P24	Vitrified Product Interim Storage	3	-	-	-	-	-	-
P18	New Analytical Lab	2	5.8×10^{-8}	1.2×10^{-7}	5.2×10^{-8}	1.0×10^{-7}	6.0×10^{-9}	1.2×10^{-8}
P118	Separations Organic Incinerator Project	2	2.9×10^{-9}	5.8×10^{-9}	2.6×10^{-9}	5.2×10^{-9}	3.0×10^{-10}	6.0×10^{-10}
P133	Multifunction Pilot Plant	2	-	-	-	-	-	-
P35D	Class A Grout Packaging and Shipping to INEEL Landfill	2	5.8×10^{-8}	1.2×10^{-7}	5.2×10^{-8}	1.0×10^{-7}	6.0×10^{-9}	1.2×10^{-8}
P27	Class A Grout in New Landfill Facility	2	-	-	-	-	-	-
Totals			3.5×10^{-7}	8.2×10^{-7}	3.2×10^{-7}	7.4×10^{-7}	3.6×10^{-8}	8.4×10^{-8}
Planning Basis Option^b								
P1A	Calcine SBW including NWCF Upgrades (MACT)	3	1.2×10^{-7}	1.7×10^{-7}	1.0×10^{-7}	1.6×10^{-7}	1.2×10^{-8}	1.8×10^{-8}
P1B	NGLWM and TF Waste Heel Waste	1	5.8×10^{-8}	5.8×10^{-8}	5.2×10^{-8}	5.2×10^{-8}	6.0×10^{-9}	6.0×10^{-9}
P59A	Calcine Retrieval and Transport	1	5.8×10^{-8}	5.8×10^{-8}	5.2×10^{-8}	5.2×10^{-8}	6.0×10^{-9}	6.0×10^{-9}
P23A	Full Separations	3	5.8×10^{-8}	1.7×10^{-7}	5.2×10^{-8}	1.6×10^{-7}	6.0×10^{-9}	1.8×10^{-8}
P23B	Vitrification Plant	3	5.8×10^{-8}	1.7×10^{-7}	5.2×10^{-8}	1.6×10^{-7}	6.0×10^{-9}	1.8×10^{-8}
P23C	Class A Grout Plant	3	5.8×10^{-8}	1.7×10^{-7}	5.2×10^{-8}	1.6×10^{-7}	6.0×10^{-9}	1.8×10^{-8}
P24	Vitrified Product Interim Storage	-	-	-	-	-	-	-
P18	New Analytical Lab	2	5.8×10^{-8}	1.2×10^{-7}	5.2×10^{-8}	1.0×10^{-7}	6.0×10^{-9}	1.2×10^{-8}
P118	Separations Organic Incinerator Project	2	2.9×10^{-9}	5.8×10^{-9}	2.6×10^{-9}	5.2×10^{-9}	3.0×10^{-10}	6.0×10^{-10}
P133	Multifunction Pilot Plant	2	-	-	-	-	-	-
P35E	Class A Grout Packaging and Loading for Offsite Disposal	2	5.8×10^{-8}	1.2×10^{-7}	5.2×10^{-8}	1.0×10^{-7}	6.0×10^{-9}	1.2×10^{-8}
Totals			4.1×10^{-7}	1.1×10^{-7}	3.7×10^{-7}	9.2×10^{-7}	4.2×10^{-8}	1.0×10^{-7}
							1.1×10^{-11}	2.6×10^{-11}

Table C.2-20. Airborne radionuclide emissions estimates for dispositioning proposed facilities associated with waste processing alternatives (continued).

Project number	Description	Duration (years)	Annual emission rate and total project emissions ^a					
			Total radioactivity		Strontium-90/Yttrium-90		Cesium-137	
			(curies per year)	(curies)	(curies per year)	(curies)	(curies per year)	(curies)
Transuranic Separations Option^c								
P59A	Calcine Retrieval and Transport	1	5.8×10^{-8}	5.8×10^{-8}	5.2×10^{-8}	5.2×10^{-8}	6.0×10^{-9}	6.0×10^{-9}
P49A	Transuranic-C Separations	3	5.8×10^{-8}	1.7×10^{-7}	5.2×10^{-8}	1.6×10^{-7}	6.0×10^{-9}	1.8×10^{-8}
P49C	Class C Grout Plant	2	5.8×10^{-8}	1.2×10^{-7}	5.2×10^{-8}	1.0×10^{-7}	6.0×10^{-9}	1.2×10^{-8}
Packaging and Loading Transuranic at INTEC for Shipment to WIPP								
P39A		2	-	-	-	-	-	-
P18	New Analytical Lab	2	5.8×10^{-8}	1.2×10^{-7}	5.2×10^{-8}	1.0×10^{-7}	6.0×10^{-9}	1.2×10^{-8}
P118	Separtions Organic Incinerator Project	2	2.9×10^{-9}	5.8×10^{-9}	2.6×10^{-9}	5.2×10^{-9}	3.0×10^{-10}	6.0×10^{-10}
P133	Multifunction Pilot Plant	2	-	-	-	-	-	-
P49D	Class C Grout Packaging & Shipping	2	5.8×10^{-8}	1.2×10^{-7}	5.2×10^{-8}	1.0×10^{-7}	6.0×10^{-9}	1.2×10^{-8}
P27	Class C Grout in New Landfill Facility	2	-	-	-	-	-	-
Totals			2.9×10^{-7}	5.9×10^{-7}	2.6×10^{-7}	5.3×10^{-7}	3.0×10^{-8}	6.0×10^{-8}
Hot Isostatic Pressed Waste Option								
Calcine SBW including NWCF Upgrades								
P1A	(MACT)	3	1.2×10^{-7}	1.7×10^{-7}	1.0×10^{-7}	1.6×10^{-7}	1.2×10^{-8}	1.8×10^{-8}
P1B	NGLWM and TF Waste Heel Waste	1	5.8×10^{-8}	5.8×10^{-8}	5.2×10^{-8}	5.2×10^{-8}	6.0×10^{-9}	6.0×10^{-9}
P18	New Analytical Lab	2	5.8×10^{-8}	1.2×10^{-7}	5.2×10^{-8}	1.0×10^{-7}	6.0×10^{-9}	1.2×10^{-8}
P59A	Calcine Retrieval and Transport	1	5.8×10^{-8}	5.8×10^{-8}	5.2×10^{-8}	5.2×10^{-8}	6.0×10^{-9}	6.0×10^{-9}
P71	Mixing and HIPing	5	5.8×10^{-8}	2.9×10^{-7}	5.2×10^{-8}	2.6×10^{-7}	6.0×10^{-9}	3.0×10^{-8}
P72	HIPed HLW Interim Storage	3	-	-	-	-	-	-
P73A	Packaging and Loading HIPed Waste at INTEC for Shipment to NGR	3	-	-	-	-	-	-
P133	Multifunction Pilot Plant	2	-	-	-	-	-	-
Totals			2.3×10^{-7}	7.0×10^{-7}	2.1×10^{-7}	6.3×10^{-7}	2.4×10^{-8}	7.2×10^{-8}
Direct Cement Waste Option								
Calcine SBW including NWCF Upgrades								
P1A	(MACT)	3	1.2×10^{-7}	1.7×10^{-7}	1.0×10^{-7}	1.6×10^{-7}	1.2×10^{-8}	1.8×10^{-8}
P1B	NGLWM and TF Waste Heel Waste	1	5.8×10^{-8}	5.8×10^{-8}	5.2×10^{-8}	5.2×10^{-8}	6.0×10^{-9}	6.0×10^{-9}
P18	New Analytical Lab	2	5.8×10^{-8}	1.2×10^{-7}	5.2×10^{-8}	1.0×10^{-7}	6.0×10^{-9}	1.2×10^{-8}
P59A	Calcine Retrieval and Transport	1	5.8×10^{-8}	5.8×10^{-8}	5.2×10^{-8}	5.2×10^{-8}	6.0×10^{-9}	6.0×10^{-9}
P80	Mixing and FUETEP Grout	3	5.8×10^{-8}	1.7×10^{-7}	5.2×10^{-8}	1.6×10^{-7}	6.0×10^{-9}	1.8×10^{-8}
Unseparated Cementitious HLW Interim Storage								
P81	Storage	3	-	-	-	-	-	-
P83A	Packaging & Loading of Cement Waste at INTEC for Shipment to NGR	4	-	-	-	-	-	-
P133	Multifunction Pilot Plant	2	-	-	-	-	-	-
Totals			2.3×10^{-7}	5.8×10^{-7}	2.1×10^{-7}	5.2×10^{-7}	2.4×10^{-8}	6.0×10^{-8}

Table C.2-20. Airborne radionuclide emissions estimates for dispositioning proposed facilities associated with waste processing alternatives (continued).

Project number	Description	Duration (years)	Annual emission rate and total project emissions ^a					
			Total radioactivity		Strontium-90/Yttrium-90		Cesium-137	
			(curies per year)	(curies)	(curies per year)	(curies)	(curies per year)	(curies)
Early Vitrification Option								
P18	Calcine Retrieval and Transport	2	5.8×10^{-8}	1.2×10^{-7}	5.2×10^{-8}	1.0×10^{-7}	6.0×10^{-9}	1.2×10^{-8}
P59A	Calcine Retrieval and Transport	1	5.8×10^{-8}	5.8×10^{-8}	5.2×10^{-8}	5.2×10^{-8}	6.0×10^{-9}	6.0×10^{-9}
P61	Vitrified HLW Interim Storage	3	-	-	-	-	-	-
Packaging/Loading Vitrified HLW at INTEC for Shipment to NGR								
P62A		3	-	-	-	-	-	-
P88	Early Vitrification with MACT	5	7.3×10^{-8}	3.6×10^{-7}	6.5×10^{-8}	3.3×10^{-7}	7.4×10^{-9}	3.7×10^{-8}
P90A	Packaging & Loading Vitrified SBW at INTEC for Shipment to WIPP	2	-	-	-	-	-	-
P133	Multifunction Pilot Plant	2	-	-	-	-	-	-
Totals			1.9×10^{-7}	5.4×10^{-7}	1.7×10^{-7}	4.8×10^{-7}	1.9×10^{-8}	5.5×10^{-8}
Minimum INEEL Processing Alternative^d								
P18	New Analytical Lab	2	5.8×10^{-8}	1.2×10^{-7}	5.2×10^{-8}	1.0×10^{-7}	6.0×10^{-9}	1.2×10^{-8}
P24	Vitrified Product Interim Storage	3	-	-	-	-	-	-
P27	Class A Grout in New Landfill Facility	2	-	-	-	-	-	-
P111	SBW Treatment with CsIX	1	5.8×10^{-8}	5.8×10^{-8}	5.2×10^{-8}	5.2×10^{-8}	6.0×10^{-9}	6.0×10^{-9}
P112A	Packaging and Loading CH-Transuranic for Transport to WIPP	5	-	-	-	-	-	-
P133	Multifunction Pilot Plant	2	-	-	-	-	-	-
P59B	Calcine Retrieval and Transport Just in Time	1	5.8×10^{-8}	1.2×10^{-7}	5.2×10^{-8}	5.2×10^{-8}	6.0×10^{-9}	6.0×10^{-9}
P117B	Calcine Packaging & Loading Just in Time	3	1.7×10^{-7}	5.2×10^{-7}	1.6×10^{-7}	4.7×10^{-7}	1.8×10^{-8}	5.4×10^{-8}
Totals			3.5×10^{-7}	8.1×10^{-7}	3.1×10^{-7}	6.8×10^{-7}	3.6×10^{-8}	7.7×10^{-8}
								8.9×10^{-12}
								1.9×10^{-11}

- a. Annual emissions represent the highest projected emission rate for any single year. Total emissions value is the product of annual emissions for each dispositioning project and the duration (in years) of that project. Annual totals include only those projects which are projected to occur over a similar time frame. Source: Project Data Sheets (Appendix C.6).
- b. Assumes disposal of Class A grout either offsite or in new INEEL landfill facility; impacts of disposal in Tank Farm and bin sets are addressed in Figure 5.3-5.
- c. Assumes disposal of Class C grout in new facility; impacts of disposal in Tank Farm and bin sets are addressed Figure 5.3-5.
- d. Assumes “just-in-time” shipping scenario; emissions from option involving interim storage of calcine at Hanford would be somewhat less. Includes emissions at INEEL only.

Table C.2-21. Summary of radiation dose impacts associated with airborne radionuclide emissions from dispositioning facilities associated with waste processing alternatives.

Case (units)	Applicable Standard	No Action Alternative	Continued Current Operations Alternative	Impact of alternative ^a								Minimum INEEL Processing Alternative at INEEL ^d	
				Separations Alternative				Non-Separations Alternative					
				Full Separations Option ^b	Planning Basis Option ^b	Transuranic Separations Option ^c	Hot Isostatic Pressed Waste Option	Direct Cement Waste Option	Early Vitrification Option				
Dose to maximally-exposed offsite individual (millirem per year)	10 ^e	-	1.1×10 ⁻¹⁰	3.3×10 ⁻¹⁰	3.9×10 ⁻¹⁰	4.7×10 ⁻¹⁰	1.8×10 ⁻¹⁰	1.3×10 ⁻¹⁰	1.4×10 ⁻¹⁰			5.6×10 ⁻¹⁰	
Dose to noninvolved worker (millirem per year) ^f	5,000 ^g	-	2.0×10 ⁻¹¹	6.0×10 ⁻¹¹	7.0×10 ⁻¹¹	1.4×10 ⁻¹⁰	3.7×10 ⁻¹¹	2.1×10 ⁻¹¹	2.8×10 ⁻¹¹			1.6×10 ⁻¹⁰	
Collective dose to population within 80 kilometers of INTEC (person-rem per year) ^h	N.A.	-	3.4×10 ⁻⁹	1.0×10 ⁻⁸	1.2×10 ⁻⁸	1.1×10 ⁻⁸	4.7×10 ⁻⁹	3.8×10 ⁻⁹	3.9×10 ⁻⁹			1.3×10 ⁻⁸	

a. Doses are maximum effective dose equivalents over any single year during which dispositioning occurs. Annual totals include only those projects which are projected to occur over a similar time frame.
 b. Impacts do not include disposal of Class A Grout in Tank Farm and bin sets, which are presented in Table 5.3-5.
 c. Impacts do not include disposal of Class C Grout in Tank Farm and bin sets, which are presented in Table 5.3-5.
 d. Assumes "just-in-time" shipping scenario; impacts of option involving interim storage of calcine at Hanford would be somewhat less. Does not include doses at Hanford.
 e. EPA dose limit specified in 40 CFR 61.92; applies to effective dose equivalent from air releases only.
 f. Location of highest onsite dose is Central Facilities Area.
 g. Occupational dose limit per 10 CFR 835.202; applies to sum of doses from all exposure pathways.
 h. A reference population of 200,000 people is used for future population dose estimates. At currently projected growth rates, this is the approximate population level that would exist around the Year 2030. During 1990, this population was 118,644.

Table C.2-22. Airborne radionuclide emissions estimates for dispositioning the Tank Farm and bin sets under alternative closure scenarios.

Project number	Description	Duration (years)	Annual emission rate and total project emissions ^a					
			Total radioactivity		Strontium-90/Yttrium-90		Cesium-137	
			(curies per year)	(curies)	(curies per year)	(curies)	(curies per year)	(curies)
Tank Farm								
P59G	Clean Closure	17	8.6×10^{-7}	1.5×10^{-5}	4.2×10^{-7}	7.1×10^{-6}	4.4×10^{-7}	7.4×10^{-6}
P3B	Performance-Based Closure with Clean Fill	17	1.1×10^{-7}	1.8×10^{-6}	5.2×10^{-8}	8.8×10^{-7}	5.5×10^{-8}	9.3×10^{-7}
P3C	Closure to Landfill Standards	17	7.8×10^{-7}	1.3×10^{-5}	3.8×10^{-7}	6.4×10^{-6}	4.0×10^{-7}	6.7×10^{-6}
P26/51	Performance-Based Closure with Class A or C Fill	27	1.1×10^{-7}	2.4×10^{-6}	5.3×10^{-8}	1.2×10^{-6}	5.6×10^{-8}	1.2×10^{-6}
Bin Sets								
P59F	Clean Closure	20	1.3×10^{-7}	2.6×10^{-6}	1.2×10^{-7}	2.3×10^{-6}	1.3×10^{-8}	2.7×10^{-7}
P59C	Performance-Based Closure with Clean Fill	20	1.7×10^{-7}	3.4×10^{-6}	1.5×10^{-5}	3.0×10^{-6}	1.7×10^{-8}	3.5×10^{-7}
P59D	Closure to Landfill Standards	20	1.2×10^{-6}	2.4×10^{-5}	1.1×10^{-6}	2.2×10^{-5}	1.2×10^{-7}	2.5×10^{-6}
P26/51	Performance-Based Closure with Class A or C Fill	18	1.7×10^{-7}	2.5×10^{-6}	1.5×10^{-7}	2.3×10^{-6}	1.7×10^{-8}	2.6×10^{-7}

a. Annual emissions represent the highest projected emission rate for any single year. Total emissions value is the product of annual emissions for each dispositioning project and the duration (in years) of that project. Annual totals include only those projects which are projected to occur over a similar time frame. Source: Project Data Sheets (Appendix C.6).

Table C.2-24. Airborne radionuclide emissions estimates for dispositioning other existing facilities associated with HLW management.

Facility group	Closure method ^b	Duration (years)	Annual emission rate and total project emissions ^a					
			Total Activity		Strontium-90/Yttrium-90		Cesium-137	
			(curies per year)	(curies)	(curies per year)	(curies)	(curies per year)	(curies)
Tank Farm Related Facilities								
Waste Storage Control House (CPP-619)	Landfill	6	1.5×10^{-8}	8.7×10^{-7}	7.0×10^{-8}	4.2×10^{-8}	7.4×10^{-9}	4.4×10^{-8}
Waste Storage Control House (CPP-628)	Landfill	6	1.5×10^{-8}	8.7×10^{-8}	7.0×10^{-9}	4.2×10^{-8}	7.4×10^{-9}	4.4×10^{-8}
Waste/Station Tank Transfer Bldg. (CPP-638)	Landfill	2	1.5×10^{-8}	2.9×10^{-8}	7.0×10^{-9}	1.4×10^{-8}	7.4×10^{-9}	1.5×10^{-8}
Instrument House (CPP-712)	Landfill	6	1.5×10^{-8}	8.7×10^{-8}	7.0×10^{-9}	4.2×10^{-8}	7.4×10^{-9}	4.4×10^{-8}
STR Waste Storage Tanks (CPP-717)	Landfill	6	1.5×10^{-8}	8.7×10^{-8}	7.0×10^{-9}	4.2×10^{-8}	7.4×10^{-9}	4.4×10^{-8}
Total			5.8×10^{-8}	3.8×10^{-7}	2.8×10^{-8}	1.8×10^{-7}	3.0×10^{-8}	1.9×10^{-7}
Bin Set Related Facilities								
Instrument Bldg. for Bin Set 1 (CPP-639)	Landfill	6	1.5×10^{-8}	8.7×10^{-8}	1.3×10^{-8}	7.8×10^{-8}	1.5×10^{-9}	8.9×10^{-9}
Instr. Bldg. for 2 nd Set of calcined solids (CPP-646)	Landfill	6	1.5×10^{-8}	8.7×10^{-8}	1.3×10^{-8}	7.8×10^{-8}	1.5×10^{-9}	8.9×10^{-9}
Instr. Bldg. for 3 rd Set of calcined solids (CPP-647)	Landfill	6	1.5×10^{-8}	8.7×10^{-8}	1.3×10^{-8}	7.8×10^{-8}	1.5×10^{-9}	8.9×10^{-9}
Instr. Bldg. for 4 th Set of calcined solids (CPP-658)	Landfill	6	1.5×10^{-8}	8.7×10^{-8}	1.3×10^{-8}	7.8×10^{-8}	1.5×10^{-9}	8.9×10^{-9}
Instr. Bldg. for 5 th Set of calcined solids (CPP-671)	Landfill	6	1.5×10^{-8}	8.7×10^{-8}	1.3×10^{-8}	7.8×10^{-8}	1.5×10^{-9}	8.9×10^{-9}
Instr. Bldg. for 6 th Set of calcined solids (CPP-673)	Landfill	6	1.5×10^{-8}	8.7×10^{-8}	1.3×10^{-8}	7.8×10^{-8}	1.5×10^{-9}	8.9×10^{-9}
Total			8.7×10^{-8}	5.2×10^{-7}	7.8×10^{-8}	4.7×10^{-7}	8.9×10^{-9}	5.4×10^{-8}
Process Equipment Waste Evaporator and Related Facilities								
Liquid Effluent Treat. & Disp. Bldg. (CPP-1618)	Clean	6	1.5×10^{-8}	8.7×10^{-8}	7.0×10^{-9}	4.2×10^{-8}	7.4×10^{-9}	4.4×10^{-8}
Waste Holdup Pumphouse (CPP-641)	Clean	2	1.5×10^{-8}	2.9×10^{-8}	7.0×10^{-9}	1.4×10^{-8}	7.4×10^{-9}	1.5×10^{-8}
PEW Evaporator Bldg. (CPP-604)	Landfill	6	1.5×10^{-8}	8.7×10^{-8}	7.0×10^{-9}	4.2×10^{-8}	7.4×10^{-9}	4.4×10^{-8}
Atmospheric Protection Bldg. (CPP-649)	Landfill	6	1.5×10^{-8}	8.7×10^{-8}	7.0×10^{-9}	4.2×10^{-8}	7.4×10^{-9}	4.4×10^{-8}
Pre-Filter Bldg. (CPP-756)	Landfill	6	1.5×10^{-8}	8.7×10^{-8}	7.0×10^{-9}	4.2×10^{-8}	7.4×10^{-9}	4.4×10^{-8}
Blower Bldg. (CPP-605)	Landfill	6	1.5×10^{-8}	8.7×10^{-8}	7.0×10^{-9}	4.2×10^{-8}	7.4×10^{-9}	4.4×10^{-8}
Main Exhaust Stack (CPP-708)	Landfill	6	1.5×10^{-8}	8.7×10^{-8}	7.0×10^{-9}	4.2×10^{-8}	7.4×10^{-9}	4.4×10^{-8}
Total			1.0×10^{-7}	5.5×10^{-7}	4.9×10^{-8}	2.7×10^{-7}	5.2×10^{-8}	2.8×10^{-7}
Fuel Processing Building and Related Facilities								
Fuel Processing Building (CPP-601)	Perf.-Based or Landfill	10	5.8×10^{-8}	5.8×10^{-7}	2.8×10^{-8}	2.8×10^{-7}	3.0×10^{-8}	3.0×10^{-7}
Remote Analytical Facility Building (CPP-627)	Perf.-Based or Landfill	10	5.8×10^{-8}	5.8×10^{-7}	2.8×10^{-8}	2.8×10^{-7}	3.0×10^{-8}	3.0×10^{-7}
Head End Process Plant (CPP-640)	Perf.-Based or Landfill	10	5.8×10^{-8}	5.8×10^{-7}	2.8×10^{-8}	2.8×10^{-7}	3.0×10^{-8}	3.0×10^{-7}
Total				1.7×10^{-7}	1.7×10^{-6}	8.5×10^{-8}	8.5×10^{-7}	8.9×10^{-7}
								5.7×10^{-10}
								5.7×10^{-9}

Table C.2-24. (continued).

Facility group	Closure method ^b	Duration (years)	Annual emission rate and total project emissions ^a							
			Total Activity		Strontium-90/Yttrium-90		Cesium-137		Plutonium-239	
			(curies per year)	(curies)	(curies per year)	(curies)	(curies per year)	(curies)	(curies per year)	(curies)
Fluorinel and Storage Facility and Related Facilities										
FAST Facility and Stack	- ^c	6	5.8×10^{-8}	3.5×10^{-7}	2.8×10^{-8}	1.7×10^{-7}	1.4×10^{-8}	8.7×10^{-8}	4.7×10^{-11}	2.8×10^{-10}
New Waste Calcining Facility										
New Waste Calcining Facility	Perf.-Based or Landfill	3	5.8×10^{-8}	1.7×10^{-7}	5.2×10^{-8}	1.6×10^{-7}	6.0×10^{-9}	1.8×10^{-8}	1.5×10^{-12}	4.5×10^{-12}
Remote Analytical Laboratory										
Remote Analytical Laboratory (CPP-684)	Perf.-Based	6	2.9×10^{-8}	1.7×10^{-7}	1.4×10^{-8}	8.5×10^{-8}	1.5×10^{-8}	8.9×10^{-8}	9.5×10^{-11}	5.7×10^{-10}

- a. Annual emissions represent the highest emission rate for any single year and are the sum of annual emission rates for each activity within a group that may occur during a common year; cumulative emissions are the annual rate multiplied by duration in years. Facility group totals are the sums of individual projects within that group. Annual emission rate totals are for projects that would occur over the same general time frame. All values are rounded to two significant figures. Source: Project Data Sheets (Appendix C.6).
- b. See Table 3-4 for facility disposition alternatives that apply to each group. The Fuel Processing Building and Related Facilities and the New Waste Calcining Facility could be dispositioned by either performance-based closure or closure to landfill standards. Individual facilities within all other groups would be dispositioned according to a single closure method.
- c. Project includes deactivation and demolition of the Fluorinel and Storage Facility building (CPP-666) and the associated stack (CPP-767). The Fluorinel and Storage Facility building would be closed according to performance-based closure criteria and the stack by clean closure. Emissions listed are totals from closure of both facilities.

Table C.2-25. Summary of radiation dose impacts associated with airborne radionuclide emissions from dispositioning other existing facilities associated with high-level waste management.

Case	Applicable Standard	Maximum annual radiation dose ^a							
		Tank Farm Related Facilities	Bin Set Related Facilities	Process Equip. Waste Evaporator and Related Facilities	Fuel Process. Building and Related Facilities	Fluorinel and Storage Facility and Related Facilities	Transport Lines Group	New Waste Calcining Facility	Remote Analytical Laboratory
Dose to maximally-exposed offsite individual (millirem per year)	10^b	8.1×10^{-11}	6.7×10^{-10}	1.2×10^{-10}	2.4×10^{-10}	8.1×10^{-11}	- ^c	4.5×10^{-11}	4.1×10^{-11}
Dose to maximally-exposed noninvolved worker (millirem per year) ^d	$5,000^e$	8.1×10^{-11}	1.6×10^{-10}	1.2×10^{-10}	2.4×10^{-10}	8.1×10^{-11}	-	1.0×10^{-11}	4.1×10^{-11}
Collective dose to population within 50 miles of INTEC (person-rem per year) ^f	NA	2.1×10^{-9}	3.7×10^{-9}	3.1×10^{-9}	6.2×10^{-9}	2.1×10^{-9}	-	2.5×10^{-9}	1.0×10^{-9}

- a. Doses are maximum effective dose equivalents over any single year during which dispositioning occurs. Annual totals include only those projects which are projected to occur over a similar time frame.
- b. EPA dose limit specified in 40 CFR 61.92; applies to effective dose equivalent from air releases only.
- c. There would be no radionuclide emissions for this group under this closure option.
- d. Location of highest onsite dose is Central Facilities Area.
- e. Occupational dose limit per 10 CFR 835.202; applies to sum of doses from all exposure pathways.
- f. A reference population of 200,000 people is used for future population dose estimates. At currently projected growth rates, this is the approximate population level that would exist around the year 2030. During 1990, this population was 118,644.

Table C.2-26. Summary of nonradiological air pollutant emissions estimates for dispositioning proposed facilities associated with waste processing alternatives.

C.2-71

DOE/EIS-0287D

Idaho HLW & FD EISS

Table C.2-26. Summary of nonradiological air pollutant emissions estimates for dispositioning proposed facilities associated with waste processing alternatives (continued).

Project number	Description	Duration (years)	Annual and cumulative project emissions ^a					
			Criteria pollutants ^b		Toxic air pollutants		Carbon dioxide ^c	
			(tons/year)	(tons)	(pounds per year)	(pounds)	(tons/year)	(tons)
Transuranic Separations Option^e								
P59A	Calcine Retrieval and Transport	1	57	57	65	65	1,300	1,300
P49A	Transuranic-C Separations	3	94	280	107	320	2,100	6,200
P49C	Class C Grout Plant	2	64	130	73	150	1,400	2,800
P39A	Packaging and Loading Transuranic at INTEC for Shipment to WIPP	2	29	43	33	49	630	950
P18	New Analytical Lab	2	83	170	95	190	1,800	3,700
P118	Separations Organic Incinerator	2	6	12	7	14	130	260
P133	Waste Treatment Pilot Plant	2	31	63	36	71	690	1,400
P49D	Class C Grout Packaging & Shipping	2	11	23	13	26	250	500
P27	Class C Grout in New Landfill Facility	2	32	64	36	72	700	1,400
Totals			407	840	460	960	9,000	18,000
Hot Isostatic Pressed Waste Option								
P1A	Calcine SBW including NWCF Upgrades (MACT)	3	103	150	120	170	2,300	3,300
P1B	NGLWM and TF Waste Heel Waste	1	38	38	43	43	840	840
P18	New Analytical Lab	2	83	160	95	190	1,800	3,700
P59A	Calcine Retrieval and Transport	1	57	57	65	65	1,300	1,300
P71	Mixing and HIPing	5	49	250	56	280	1,100	5,400
P72	HIPed HLW Interim Storage	3	38	110	43	130	830	2,500
P73A	Packaging and Loading HIPed Waste at INTEC for Shipment to NGR	3	29	72	33	82	630	1,600
P133	Waste Treatment Pilot Plant	2	31	63	36	71	690	1,400
Totals			430	900	490	1,000	9,400	20,000
Direct Cement Waste Option								
P1A	Calcine SBW including NWCF Upgrades (MACT)	3	103	150	120	170	2,300	3,300
P1B	NGLWM and TF Waste Heel Waste	1	38	38	43	43	840	840
P18	New Analytical Lab	2	83	170	95	190	1,800	3,700
P59A	Calcine Retrieval and Transport	1	57	57	65	65	1,300	1,300
P80	Direct Cement Process	3	72	220	82	250	1,600	4,800
P81	Unseparated Cementitious HLW Interim Storage	3	66	200	75	230	1,400	4,300
P83A	Packaging & Loading of Cement Waste at INTEC for Shipment to NGR	4	29	100	33	110	630	2,200
P133	Waste Treatment Pilot Plant	2	31	63	36	71	690	1,400
Totals			480	990	550	1,100	11,000	22,000

Table C.2-26. Summary of nonradiological air pollutant emissions estimates for dispositioning proposed facilities associated with waste processing alternatives (continued).

Project number	Description	Duration (years)	Annual and cumulative project emissions ^a					
			Criteria pollutants ^b		Toxic air pollutants		Carbon dioxide ^c	
			(tons/year)	(tons)	(pounds per year)	(pounds)	(tons/year)	(tons)
Early Vitrification Option								
P18	Calcine Retrieval and Transport	2	83	170	95	190	1,800	3,700
P59A	Calcine Retrieval and Transport	1	57	57	65	65	1,300	1,300
P61	Vitrified HLW Interim Storage	3	53	160	61	180	1,200	3,500
P62A	Packaging/Loading Vitrified HLW at INTEC for Shipment to NGR	3	29	86	33	98	630	1,900
P88	Early Vitrification with MACT	5	106	530	120	606	2,300	12,000
P90A	Packaging & Loading Vitrified SBW at INTEC for Shipment to WIPP	2	29	43	33	49	630	950
P133	Waste Treatment Pilot Plant	2	31	63	36	71	690	1,400
Totals			390	1,100	440	1,300	8,500	24,000
Minimum INEEL Processing Alternative^f								
P18	New Analytical Lab	2	83	170	95	190	1,800	3,700
P24	Vitrified Product Interim Storage	3	17	48	19	55	370	1,100
P27	Class A Grout in New Landfill Facility	2	32	64	36	72	700	1,400
P111	SBW Treatment with CsIX	1	38	38	43	43	840	840
P112A	Packaging and Loading CH-Transuranic for Transport to WIPP	5	29	130	33	150	630	2,800
P133	Waste Treatment Pilot Plant	2	31	63	36	71	690	1,400
P59B	Calcine Retrieval and Transport Just in Time	1	180	180	200	200	3,800	3,800
P117B	Calcine Packaging & Loading Just in Time	3	47	140	53	160	1,000	3,100
Totals			450	820	510	940	9,900	18,000

- a. Maximum annual emissions represent the highest emission rate for any single year; total emissions value is the product of annual emissions for each dispositioning project and the duration (in years) of that project. Source: Project Data Sheets (Appendix C.6).
- b. The specific pollutants and approximate relative percentages are as follows: carbon monoxide - 45 percent; sulfur dioxide - 7 percent; nitrogen dioxide - 38 percent; particulate matter - 2 percent; and volatile organic compounds - 8 percent.
- c. Carbon dioxide is listed because this gas has been implicated in global warming.
- d. Assumes disposal of Class A grout either offsite (Full Separations and Planning Basis Options) or in new INEEL landfill facility (Full Separations Option); impacts of disposal in Tank Farm and bin sets are addressed in Section C.2.7.2.
- e. Assumes disposal of Class C grout in new facility; impacts of disposal in Tank Farm and bin sets are addressed in Section C.2.7.2.
- f. Assumes “just-in-time” shipping scenario; nonradiological emissions impacts of interim storage of calcine at Hanford would be somewhat less.

Table C.2-27. Maximum criteria pollutant impacts from dispositioning of facilities associated with waste processing alternatives.

Pollutant	Averaging time	Impact of alternative (micrograms per cubic meter)			Cumulative impact (micrograms per cubic meter) ^a			Percent of standard ^b		
		INEEL boundary	Public roads	Craters of the Moon	INEEL boundary	Public roads	Craters of the Moon	INEEL boundary	Public roads	Craters of the Moon
		No Action Alternative								
Carbon monoxide	1-hour	-	-	-	210	420	12	<1	1	<1
	8-hour	-	-	-	78	66	4.2	<1	<1	<1
Nitrogen dioxide	Annual	-	-	-	0.50	1.2	0.060	<1	1	<1
Sulfur dioxide	3-hour	-	-	-	24	38	3.8	2	3	<1
	24-hour	-	-	-	5.3	10	1.3	1	3	<1
Respirable particulates ^c	Annual	-	-	-	0.14	0.45	0.020	<1	<1	<1
	24-hour	-	-	-	12	24	1.0	8	16	<1
Lead	Annual	-	-	-	0.49	1.8	0.040	<1	4	<1
	Quarterly	-	-	-	2.3×10^{-4}	5.0×10^{-4}	5.5×10^{-5}	<1	<1	<1
Continued Current Operations Alternative										
Carbon monoxide	1-hour	140	380	32	340	800	44	<1	2	<1
	8-hour	54	140	5.5	130	210	10	1	2	<1
Nitrogen dioxide	Annual	0.13	0.51	0.010	0.59	1.7	0.070	<1	2	<1
Sulfur dioxide	3-hour	14	33	2.3	37	71	6.0	3	5	<1
	24-hour	2.9	7.7	0.29	8.3	18	1.5	2	5	<1
Respirable particulates ^c	Annual	0.020	0.090	2.0×10^{-3}	0.16	0.55	0.020	<1	<1	<1
	24-hour	1.1	2.8	0.11	13	27	1.1	9	18	<1
Lead	Annual	9.0×10^{-3}	0.030	8.0×10^{-4}	0.50	1.8	0.040	<1	4	<1
	Quarterly	1.9×10^{-6}	6.1×10^{-6}	1.8×10^{-7}	2.3×10^{-4}	5.0×10^{-4}	5.5×10^{-5}	<1	<1	<1
Full Separations Option										
Carbon monoxide	1-hour	440	1,300	104	650	1,700	120	2	4	<1
	8-hour	180	470	18	260	530	22	3	5	<1
Nitrogen dioxide	Annual	0.43	1.7	0.040	0.89	2.9	0.10	<1	3	<1
Sulfur dioxide	3-hour	46	110	7.4	69	150	11	5	11	<1
	24-hour	10	25	0.90	15	35	2.2	4	10	<1
Respirable particulates ^c	Annual	0.080	0.30	7.0×10^{-3}	0.22	0.75	0.020	<1	<1	<1
	24-hour	3.5	9.2	0.35	15	34	1.3	10	22	<1
Lead	Annual	0.030	0.11	3.0×10^{-3}	0.52	1.9	0.050	1	4	<1
	Quarterly	6.1×10^{-6}	2.0×10^{-5}	5.8×10^{-7}	2.4×10^{-4}	5.1×10^{-4}	5.6×10^{-5}	<1	<1	<1
Planning Basis Option										
Carbon monoxide	1-hour	540	1.5×10^3	130	750	2.0×10^3	140	2	5	<1
	8-hour	220	570	22	300	640	26	3	6	<1
Nitrogen dioxide	Annual	0.53	2.0	0.050	1.0	3.3	0.10	<1	3	<1
Sulfur dioxide	3-hour	56	130	9.1	80	170	13	6	13	<1
	24-hour	12	31	1.2	17	41	2.4	5	11	<1
Respirable particulates ^c	Annual	0.10	0.37	9.0×10^{-3}	0.24	0.82	0.020	<1	1	<1
	24-hour	4.3	11	0.43	16	36	1.4	11	24	<1
Lead	Annual	0.040	0.13	3.0×10^{-3}	0.53	1.9	0.050	1	4	<1
	Quarterly	7.5×10^{-6}	2.4×10^{-5}	7.1×10^{-7}	2.4×10^{-4}	5.2×10^{-4}	5.6×10^{-5}	<1	<1	<1

Table C.2-27. Maximum criteria pollutant impacts from dispositioning of facilities associated with waste processing alternatives (continued).

Pollutant	Averaging time	Impact of alternative (micrograms per cubic meter)			Cumulative impact (micrograms per cubic meter) ^a			Percent of standard ^b		
		INEEL boundary	Public roads	Craters of the Moon	INEEL boundary	Public roads	Craters of the Moon	INEEL boundary	Public roads	Craters of the Moon
Transuranic Separations Option										
Carbon monoxide	1-hour	370	1.1×10^3	87	580	1.5×10^3	99	1	4	<1
	8-hour	150	390	15	230	460	19	2	5	<1
Nitrogen dioxide	Annual	0.37	1.4	0.030	0.82	2.6	0.090	<1	3	<1
Sulfur dioxide	3-hour	38	91	6.2	62	130	10	5	10	<1
	24-hour	8.1	21	0.80	13	31	2.0	4	9	<1
	Annual	0.070	0.25	6.0×10^{-3}	0.21	0.71	0.020	<1	<1	<1
Respirable particulates ^c	24-hour	3.0	7.7	0.29	15	32	1.3	10	21	<1
	Annual	0.020	0.090	2.0×10^{-3}	0.51	1.8	0.050	1	4	<1
Lead	Quarterly	5.1×10^{-6}	1.7×10^{-5}	4.9×10^{-7}	2.4×10^{-4}	5.1×10^{-4}	5.5×10^{-5}	<1	<1	<1
Hot Isostatic Pressed Waste Option										
Carbon monoxide	1-hour	390	1.1×10^3	91	600	1.5×10^3	100	1	4	<1
	8-hour	160	410	16	240	480	20	2	5	<1
Nitrogen dioxide	Annual	0.38	1.5	0.030	0.84	2.7	0.090	<1	3	<1
Sulfur dioxide	3-hour	40	95	6.5	64	134	10	5	10	<1
	24-hour	8.5	22	0.84	14	32	2.1	4	9	<1
	Annual	0.070	0.26	6.0×10^{-3}	0.21	0.72	0.020	<1	<1	<1
Respirable particulates ^c	24-hour	3.1	8.1	0.31	15	32	1.3	10	22	<1
	Annual	0.030	0.10	2.0×10^{-3}	0.52	1.8	0.050	1	4	<1
Lead	Quarterly	5.4×10^{-6}	1.8×10^{-5}	5.1×10^{-7}	2.4×10^{-4}	5.1×10^{-4}	5.6×10^{-5}	<1	<1	<1
Direct Cement Waste Option										
Carbon monoxide	1-hour	440	1.2×10^3	102	640	1.6×10^3	114	2	4	<1
	8-hour	180	460	18	250	530	22	3	5	<1
Nitrogen dioxide	Annual	0.43	1.6	0.040	0.89	2.9	0.10	<1	3	<1
Sulfur dioxide	3-hour	45	110	7.3	69	145	11	5	11	<1
	24-hour	10	25	0.94	15	35	2.2	4	10	<1
	Annual	0.080	0.30	7.0×10^{-3}	0.22	0.75	0.020	<1	<1	<1
Respirable particulates ^c	24-hour	3.5	9.1	0.34	15	33	1.3	10	22	<1
	Annual	0.030	0.11	0.020	0.52	1.9	0.050	1	4	<1
Lead	Quarterly	6.0×10^{-6}	2.0×10^{-5}	5.7×10^{-7}	2.4×10^{-4}	5.1×10^{-4}	5.6×10^{-5}	<1	<1	<1
Early Vitrification Option										
Carbon monoxide	1-hour	350	1.0×10^3	83	559	1.4×10^3	95	1	4	<1
	8-hour	140	370	14	221	440	19	2	4	<1
Nitrogen dioxide	Annual	0.35	1.3	0.030	0.8	2.6	0.090	<1	3	<1
Sulfur dioxide	3-hour	37	86	5.9	60	130	10	5	10	<1
	24-hour	7.7	20	0.76	13	30	2.0	4	8	<1
	Annual	0.060	0.24	6.0×10^{-3}	0.2	0.69	0.020	<1	<1	<1
Respirable particulates ^c	24-hour	2.8	7.4	0.28	15	32	1.2	10	21	<1
	Annual	0.020	0.090	2.0×10^{-3}	0.51	1.8	0.050	1	4	<1
Lead	Quarterly	4.9×10^{-6}	1.6×10^{-5}	4.6×10^{-7}	2.3×10^{-4}	5.1×10^{-4}	5.5×10^{-5}	<1	<1	<1

Table C.2-27. Maximum criteria pollutant impacts from dispositioning of facilities associated with waste processing alternatives (continued).

Pollutant	Averaging time	Impact of alternative (micrograms per cubic meter)			Cumulative impact (micrograms per cubic meter) ^a			Percent of standard ^b		
		INEEL boundary	Public roads	Craters of the Moon	INEEL boundary	Public roads	Craters of the Moon	INEEL boundary	Public roads	Craters of the Moon
		Minimum INEEL Processing Alternative ^d								
Carbon monoxide	1-hour	410	1.2×10^3	97	620	1.6×10^3	110	2	4	<1
	8-hour	170	430	17	240	500	21	2	5	<1
Nitrogen dioxide	Annual	0.40	1.6	0.040	0.86	2.8	0.090	<1	3	<1
Sulfur dioxide	3-hour	43	100	6.9	66	139	11	5	11	<1
	24-hour	9.0	23	0.88	14	33	2.1	4	9	<1
	Annual	0.070	0.28	7.0×10^{-3}	0.21	0.73	0.020	<1	<1	<1
Respirable particulates ^c	24-hour	3.3	8.6	0.32	15	33	1.3	10	22	<1
	Annual	0.030	0.10	2.0×10^{-3}	0.52	1.9	0.050	1	4	<1
Lead	Quarterly	5.7×10^{-6}	1.9×10^{-5}	5.4×10^{-7}	2.4×10^{-4}	5.1×10^{-4}	5.6×10^{-5}	<1	<1	<1

- a. Cumulative impacts conservatively assume that the highest concentration for the alternative and the highest baseline concentration occur at the same location and (for concentrations other than annual averages) over the same time period.
- b. Cumulative impacts are compared to the applicable standards provided in Table C.2-15. All standards except that for 3-hour sulfur dioxide are primary standards designed to protect public health. The 3-hour sulfur dioxide standard is a secondary standard designed to protect public welfare. (There is no primary standard for 3-hour sulfur dioxide.)
- c. Values do not include contributions of fugitive dust.
- d. Impacts for the Minimum INEEL Processing Alternative do not include impacts at Hanford.

Table C.2-28. Summary of maximum toxic air pollutant concentrations at onsite and offsite locations by waste processing alternative.

Receptor	No Action Alternative	Continued Current Operations	Highest percentage of applicable standard ^{a,b}						Minimum INEEL Processing Alternative	
			Separations Alternative			Non-Separations Alternative				
			Full Separations Option	Planning Basis Option	Transuranic Separations Option	Hot Isostatic Pressed Waste Option	Direct Cement Waste Option	Early Vitrification Option		
Carcinogens										
INEEL boundary areas	-	0.65	2.1	2.6	1.8	1.9	2.1	1.7	2.0	
Craters of the Moon	-	0.060	0.19	0.24	0.16	0.17	0.19	0.15	0.18	
INEEL facility area location ^d	-	6.5	21	26	18	19	21	17	20	
Noncarcinogens										
INEEL boundary areas	-	0.051	0.17	0.20	0.14	0.15	0.16	0.13	0.15	
Craters of the Moon	-	5.0×10^{-3}	0.016	0.020	0.014	0.014	0.016	0.013	0.020	
Public road locations	-	0.13	0.43	0.53	0.36	0.38	0.43	0.35	0.40	
INEEL facility area location ^d	-	4.9	16	20	13	14	16	13	15	

- a. Applicable ambient air standards are specified in IDHW (1997) for carcinogenic air pollutants and noncarcinogenic toxic air pollutant increments. It should be noted that these standards apply only to new sources; for existing sources, they are used here as reference values for purposes of comparison.
- b. Applicable standard for onsite levels is the 8-hour occupational exposure limit established by either the American Conference of Government Industrial Hygienists or the Occupational Safety and Health Administration; the lower of the two is used.
- c. In all cases, the highest carcinogenic and noncarcinogenic impacts are due to nickel and vanadium, respectively.
- d. Location of highest onsite impacts is within INTEC.

Table C.2-29. Summary of nonradiological air pollutant emissions estimates for Tank Farm and bin set closure scenarios.

Facilities	Duration (years)	Annual and cumulative project emissions ^a					
		Criteria pollutants ^b		Toxic air pollutants		Carbon dioxide ^c	
Tank Farm							
		(tons/year)	(tons)	(lb/year)	(lb)	(tons/year)	(tons)
Clean Closure	17	43	730	48	820	1,500	2.6×10^4
Performance-Based Closure with Clean Fill	17	8.5	140	10	160	180	3.0×10^3
Closure to Landfill Standards	17	6.0	100	6.7	110	130	2.1×10^3
Performance-Based Closure with Class A or C Fill	27	5.3	110	6.0	160	110	2.2×10^3
Bin Sets							
Clean Closure	20	2.1	42	2.4	48	44	870
Performance-Based Closure with Clean Fill	20	1.8	36	2.0	40	37	740
Closure to Landfill Standards	20	1.8	36	2.0	40	38	760
Performance-Based Closure with Class A or C Fill	18	2.7	33	3.0	54	55	680
							53
							1.1×10^3

a. Annual emissions represent the highest emission rate for any single year and is the sum of annual emission rates for each activity within a group that may occur during a common year; cumulative emissions is the annual rate multiplied by duration in years. Facility group totals are the sums of individual projects within that group. Annual emission rate totals are for projects that would occur over the same general time frame. All values are rounded to two significant figures. Source: Project Data Sheets (Appendix C.6).

b. The specific pollutants and approximate relative percentages are as follows: carbon monoxide - 45 percent; sulfur dioxide - 7 percent; nitrogen dioxide - 38 percent; particulate matter - 2 percent; and volatile organic compounds - 8 percent.

c. Carbon dioxide is listed because this gas has been implicated in global warming.

Table C.2-30. Maximum criteria pollutant impacts from Tank Farm and bin set closure scenarios.

Averaging time	Impact of alternative (micrograms per cubic meter)			Cumulative impact (micrograms per cubic meter) ^a			Percent of standard ^b			
	INEEL boundary	Public roads	Craters of the Moon	INEEL boundary	Public roads	Craters of the Moon	INEEL boundary	Public roads	Craters of the Moon	
	Tank Farm Closure Scenarios									
Carbon monoxide	1-hour	39	111	9.0	250	530	21	<1	1	<1
	8-hour	16	41	1.6	94	110	5.8	<1	1	<1
Nitrogen dioxide	Annual	0.04	0.15	4.0×10^{-3}	0.50	1.4	0.060	<1	1	<1
Sulfur dioxide	3-hour	4.1	10	0.66	28	48	4.5	2	4	<1
	24-hour	0.90	2.2	0.080	6.2	12	1.3	2	3	<1
	Annual	7.0×10^{-3}	0.03	6.3×10^{-4}	0.15	0.48	0.020	<1	<1	<1
Respirable particulates ^c	24-hour	0.31	0.82	0.031	12	25	1.0	8	17	<1
	Annual	2.5×10^{-3}	0.01	2.3×10^{-4}	0.49	1.8	0.040	<1	4	<1
Lead	Quarterly	5.4×10^{-7}	1.8×10^{-6}	5.1×10^{-8}	2.3×10^{-4}	5.0×10^{-4}	5.5×10^{-5}	<1	<1	<1
Performance-Based Closure										
Carbon monoxide	1-hour	7.7	22	1.8	210	441	14	<1	1	<1
	8-hour	3.1	8.0	0.32	81	74	4.5	<1	<1	<1
Nitrogen dioxide	Annual	0.010	0.030	1.0×10^{-3}	0.47	1.2	0.06	<1	1	<1
Sulfur dioxide	3-hour	0.80	1.9	0.13	24	40	3.9	2	3	<1
	24-hour	0.17	0.40	0.020	5.5	10	1.3	2	3	<1
	Annual	1.4×10^{-3}	0.010	1.2×10^{-4}	0.14	0.46	0.020	<1	<1	<1
Respirable particulates ^c	24-hour	0.062	0.16	0.010	12	25	0.97	8	16	<1
	Annual	5.0×10^{-4}	1.9×10^{-3}	4.6×10^{-5}	0.49	1.8	0.043	<1	4	<1
Lead	Quarterly	1.1×10^{-7}	3.5×10^{-7}	1.0×10^{-8}	2.3×10^{-4}	5.0×10^{-4}	5.5×10^{-5}	<1	<1	<1
Closure to Landfill Standards										
Carbon monoxide	1-hour	5.5	16	1.3	210	430	13	<1	1	<1
	8-hour	2.2	5.8	0.22	80	71	4.4	<1	<1	<1
Nitrogen dioxide	Annual	5.4×10^{-3}	0.021	4.9×10^{-4}	0.46	1.2	0.056	<1	1	<1
Sulfur dioxide	3-hour	0.57	1.3	0.090	24	40	3.9	2	3	<1
	24-hour	0.12	0.31	0.010	5.4	10	1.3	1	3	<1
	Annual	1.0×10^{-3}	0.00	8.8×10^{-5}	0.14	0.46	0.016	<1	<1	<1
Respirable particulates ^c	24-hour	0.044	0.11	4.3×10^{-3}	12	24	1.0	8	16	<1
	Annual	3.5×10^{-4}	1.4×10^{-3}	3.2×10^{-5}	0.49	1.8	0.043	<1	4	<1
Lead	Quarterly	7.5×10^{-8}	2.5×10^{-7}	7.2×10^{-9}	2.3×10^{-4}	5.0×10^{-4}	5.5×10^{-5}	<1	<1	<1
Performance-Based Closure with Class A or C Grout Disposal										
Carbon monoxide	1-hour	4.8	14	1.1	211	432	13	<1	1	<1
	8-hour	1.9	5.1	0.20	80	71	4.4	<1	<1	<1
Nitrogen dioxide	Annual	5.0×10^{-3}	0.018	4.3×10^{-4}	0.46	1.2	0.060	<1	1	<1
Sulfur dioxide	3-hour	0.50	1.2	0.080	24	40	3.9	2	3	<1
	24-hour	0.11	0.27	0.010	5.4	10	1.3	1	3	<1
	Annual	8.5×10^{-4}	3.0×10^{-3}	7.8×10^{-5}	0.14	0.50	0.020	<1	<1	<1
Respirable particulates ^c	24-hour	0.040	0.10	4.0×10^{-3}	12	24	1.0	8	16	<1
	Annual	3.1×10^{-4}	1.0×10^{-3}	2.8×10^{-5}	0.49	1.8	0.040	<1	4	<1
Lead	Quarterly	6.6×10^{-8}	2.2×10^{-7}	6.3×10^{-9}	2.3×10^{-4}	5.0×10^{-4}	5.5×10^{-5}	<1	<1	<1

Table C.2-30. Maximum criteria pollutant impacts from Tank Farm and bin set closure scenarios (continued).

Averaging time	Impact of alternative (micrograms per cubic meter)			Cumulative impact (micrograms per cubic meter) ^a			Percent of standard ^b			
	INEEL boundary	Public roads	Craters of the Moon	INEEL boundary	Public roads	Craters of the Moon	INEEL boundary	Public roads	Craters of the Moon	
	Bin Set Closure Scenarios									
Clean Closure										
Carbon monoxide	1-hour	1.9	5.4	0.45	210	420	12	<1	1	<1
	8-hour	0.77	2.0	0.080	79	68	4.3	<1	<1	<1
Nitrogen dioxide	Annual	2.0×10^{-3}	7.0×10^{-3}	1.7×10^{-4}	0.46	1.2	0.060	<1	1	<1
Sulfur dioxide	3-hour	0.20	0.47	0.030	24	39	3.8	2	3	<1
	24-hour	0.040	0.11	4.0×10^{-3}	5.4	10	1.3	1	3	<1
	Annual	3.4×10^{-4}	1.0×10^{-3}	3.1×10^{-5}	0.14	0.46	0.020	<1	<1	<1
Respirable particulates ^c	24-hour	0.015	0.040	1.5×10^{-3}	12	24	1.0	8	16	<1
	Annual	1.2×10^{-4}	4.8×10^{-4}	1.1×10^{-5}	0.49	1.8	0.040	<1	4	<1
Lead	Quarterly	2.6×10^{-8}	8.6×10^{-8}	2.5×10^{-9}	2.3×10^{-4}	5.0×10^{-4}	5.5×10^{-5}	<1	<1	<1
Performance Based Closure										
Carbon monoxide	1-hour	1.6	4.7	0.38	210	420	12	<1	1	<1
	8-hour	0.66	1.7	0.070	79	67	4.3	<1	<1	<1
Nitrogen dioxide	Annual	1.6×10^{-3}	6.0×10^{-3}	1.5×10^{-4}	0.46	1.2	0.060	<1	1	<1
Sulfur dioxide	3-hour	0.17	0.40	0.028	24	39	3.8	2	3	<1
	24-hour	0.036	0.093	3.5×10^{-3}	5.4	10	1.3	1	3	<1
	Annual	2.9×10^{-4}	1.0×10^{-3}	2.6×10^{-5}	0.14	0.50	0.020	<1	<1	<1
Respirable particulates ^c	24-hour	0.013	0.034	1.3×10^{-3}	12	24	1.0	8	16	<1
	Annual	1.1×10^{-4}	4.1×10^{-4}	9.7×10^{-6}	0.49	1.8	0.040	<1	4	<1
Lead	Quarterly	2.3×10^{-8}	7.4×10^{-8}	2.2×10^{-9}	2.3×10^{-4}	5.0×10^{-4}	5.5×10^{-5}	<1	<1	<1
Closure to Landfill Standards										
Carbon monoxide	1-hour	1.6	4.7	0.38	210	420	12	<1	1	<1
	8-hour	0.66	1.7	0.067	79	67	4.3	<1	<1	<1
Nitrogen dioxide	Annual	1.6×10^{-3}	0.006	1.5×10^{-4}	0.46	1.2	0.060	<1	1	<1
Sulfur dioxide	3-hour	0.17	0.40	0.028	24	39	3.8	2	3	<1
	24-hour	0.036	0.093	3.5×10^{-3}	5.4	10	1.3	1	3	<1
	Annual	2.9×10^{-4}	1.0×10^{-3}	2.6×10^{-5}	0.14	0.46	0.020	<1	<1	<1
Respirable particulates ^c	24-hour	0.013	0.034	1.3×10^{-3}	12	24	1.0	8	16	<1
	Annual	1.1×10^{-4}	4.1×10^{-4}	9.7×10^{-6}	0.49	1.8	0.043	<1	4	<1
Lead	Quarterly	2.3×10^{-8}	7.4×10^{-8}	2.2×10^{-9}	2.3×10^{-4}	5.0×10^{-4}	5.5×10^{-5}	<1	<1	<1
Performance-Based Closure with Class A or C Grout Disposal										
Carbon monoxide	1-hour	2.5	7.0	0.60	210	430	13	<1	1	<1
	8-hour	1.0	2.6	0.10	79	68	4.3	<1	<1	<1
Nitrogen dioxide	Annual	2.0×10^{-3}	9.0×10^{-3}	2.2×10^{-4}	0.50	1.2	0.06	<1	1	<1
Sulfur dioxide	3-hour	0.25	0.60	0.040	24	39	3.8	2	3	<1
	24-hour	0.050	0.14	0.010	5.4	10	1.3	1	3	<1
	Annual	4.4×10^{-4}	2.0×10^{-3}	4.0×10^{-5}	0.14	0.46	0.020	<1	<1	<1
Respirable particulates ^c	24-hour	0.020	0.050	2.0×10^{-3}	12	24	1.0	8	16	<1
	Annual	1.6×10^{-4}	6.1×10^{-4}	1.5×10^{-5}	0.49	1.8	0.040	<1	4	<1
Lead	Quarterly	3.4×10^{-8}	1.1×10^{-7}	3.2×10^{-9}	2.3×10^{-4}	5.0×10^{-4}	5.5×10^{-5}	<1	<1	<1

Table C.2-30. Maximum criteria pollutant impacts from Tank Farm and bin set closure scenarios (continued).

-
- a. Cumulative impacts conservatively assume that the highest concentration for the alternative and the highest baseline concentration occur at the same location and (for concentrations other than annual averages) over the same time period.
 - b. Cumulative impacts are compared to the applicable standards provided in Table C.2-15. All standards except that for 3-hour sulfur dioxide are primary standards designed to protect public health. The 3-hour sulfur dioxide standard is a secondary standard designed to protect public welfare. (There is no primary standard for 3-hour sulfur dioxide.)
 - c. Values do not include contributions of fugitive dust.
-

Table C.2-31. Summary of maximum toxic air pollutant concentrations at onsite and offsite locations from Tank Farm and bin set closure scenarios.

Case	Highest percentage of applicable standard ^{a,b}							
	Tank Farm				Bin sets			
	Clean closure	Performance-based closure	Closure to landfill standards	Performance-based closure with Class A or C grout disposal	Clean closure	Performance-based closure	Closure to landfill standards	Performance-based closure with Class A or C grout disposal
Carcinogens^c								
INEEL boundary areas	0.19	0.037	0.026	0.023	9.2×10^{-3}	7.9×10^{-3}	7.9×10^{-3}	0.012
Craters of the Moon	0.017	3.4×10^{-3}	2.4×10^{-3}	2.1×10^{-3}	<1.0×10 ⁻³	<1.0×10 ⁻³	<1.0×10 ⁻³	1.1×10^{-3}
INEEL facility area location ^d	1.9	0.37	0.26	0.23	0.092	0.079	0.079	0.12
Noncarcinogens^c								
INEEL boundary areas	0.015	2.9×10^{-3}	2.1×10^{-3}	1.8×10^{-3}	<1.0×10 ⁻³	<1.0×10 ⁻³	<1.0×10 ⁻³	<1.0×10 ⁻³
Craters of the Moon	1.4×10^{-3}	<1.0×10 ⁻³	<1.0×10 ⁻³	<1.0×10 ⁻³	<1.0×10 ⁻³	<1.0×10 ⁻³	<1.0×10 ⁻³	<1.0×10 ⁻³
Public road locations	0.038	7.6×10^{-3}	5.4×10^{-3}	4.7×10^{-3}	1.9×10^{-3}	1.6×10^{-3}	1.6×10^{-3}	2.4×10^{-3}
INEEL facility area location ^d	1.4	0.28	0.20	0.17	0.069	0.059	0.059	0.089

- a. Applicable ambient air standards are specified in IDHW (1997) for carcinogenic air pollutants and noncarcinogenic toxic air pollutant increments. It should be noted that these standards apply only to new sources; they are used here as reference values for purposes of comparison.
- b. Applicable standard for onsite levels is the 8-hour occupational exposure limit established by either the American Conference of Government Industrial Hygienists or the Occupational Safety and Health Administration; the lower of the two is used.
- c. In all cases, the highest carcinogenic and noncarcinogenic impacts are due to nickel and vanadium, respectively.
- d. Location of highest onsite impacts is within INTEC.

Table C.2-32. Summary of nonradiological air pollutant emissions estimates for dispositioning other existing INTEC facilities associated with HLW management.

Facility group	Closure method ^b	Duration (years) ^c	Annual and cumulative project emissions ^a							
			Criteria pollutants ^d		Toxic air pollutants		Carbon dioxide ^e		Fugitive dust	
			Tons/yr	Tons	Lb/yr	Lb	Tons/yr	Tons	Tons/yr	Tons
Tank Farm Related Facilities										
Waste Storage Control House (CPP-619)	Landfill	6	13	78	14	28	260	1,600	-	-
Waste Storage Control House (CPP-628)	Landfill	6	13	78	14	28	260	1,600	0.72	4.3
Waste /Station Tank Transfer Bldg. (CPP-638)	Landfill	2	13	26	15	30	260	520	-	-
Instrument House (CPP-712)	Landfill	6	13	78	14	28	260	1,600	-	-
STR Waste Storage Tanks (CPP-717)	Landfill	6	13	78	14	28	260	1,600	-	-
Total			65	440	72	490	1,300	8,800	0.72	4.3
Bin Set Related Facilities										
Instrument Bldg. for Bin Set 1 (CPP-639)	Landfill	6	75	450	84	500	1,600	9,300	-	-
Instr. Bldg. for 2 nd Set of calcined solids (CPP-646)	Landfill	6	75	450	84	500	1,600	9,300	-	-
Instr. Bldg. for 3 rd Set of calcined solids (CPP-647)	Landfill	6	75	450	84	500	1,600	9,300	-	-
Instr. Bldg. for 4 th Set of calcined solids (CPP-658)	Landfill	6	75	450	84	500	1,600	9,300	-	-
Instr. Bldg. for 5 th Set of calcined solids (CPP-671)	Landfill	6	75	450	84	500	1,600	9,300	-	-
Instr. Bldg. for 6 th Set of calcined solids (CPP-673)	Landfill	6	75	450	84	500	1,600	9,300	-	-
Total			450	2,700	500	3,000	9,300	56,000	-	-
Process Equipment Waste Evaporator and Related Facilities										
Liquid Effluent Treat. & Disp. Bldg. (CPP-1618)	Clean	6	75	450	84	500	1,500	9,000	4.3	26
Waste Holdup Pumphouse (CPP-641)	Clean	2	13	26	15	29	260	520	-	-
PEW Evaporator Bldg. (CPP-604)	Landfill	6	33	200	37	220	660	4,000	16	96
Atmospheric Protection Bldg. (CPP-649)	Landfill	6	75	450	84	500	1,500	9,000	3.3	20
Pre-Filter Bldg. (CPP-756)	Landfill	6	75	450	84	500	1,500	9,000	4.3	26
Blower Bldg. (CPP-605)	Landfill	6	75	450	84	500	1,500	9,000	3.3	20
Main Exhaust Stack (CPP-708)	Landfill	6	75	450	84	500	1,500	9,000	35	210
PEW Equip. Waste and Cell Floor Drain Lines	Landfill	1	9	9	10	10	180	180	-	-
PEW Condensate Lines	Landfill	1	9	9	10	10	180	180	-	-
Total			430	2,500	470	2,800	8,400	49,000	66	390
Fuel Processing Building and Related Facilities^b										
Fuel Processing Building (CPP-601)	Perf.-Based or Landfill	10	50	500	56	560	1,000	10,000	49	490
Remote Analytical Facility Building (CPP-627)	Perf.-Based or Landfill	10	50	500	56	560	1,000	10,000	10	100
Head End Process Plant (CPP-640)	Perf.-Based or Landfill	10	50	500	56	560	1,000	10,000	12	120
Total			150	1,500	170	1,700	3,000	30,000	71	710

Table C.2-32. (continued).

Facility group	Closure method ^b	Duration (years) ^c	Annual and cumulative project emissions ^a					
			Criteria pollutants ^d		Toxic air pollutants		Carbon dioxide ^e	
Fluorinel and Storage Facility and Related Facilities								
FAST Facility and Stack	- ^f	6	50 (tons/year)	300 (tons)	56 (pounds per year)	340 (pounds)	1,000 (tons/year)	6,000 (tons)
Transport Lines Group								
Process Off-Gas Lines	Perf.-Based	1	9.0 (tons/year)	9.0 (tons)	10 (pounds per year)	10 (pounds)	190 (tons/year)	190 (tons)
Process (Dissolver) Transport Lines	Perf.-Based	1	9.0 (tons/year)	9.0 (tons)	10 (pounds per year)	10 (pounds)	190 (tons/year)	190 (tons)
High-Level Liquid Waste (Raffinate) Lines	Landfill	1	9.0 (tons/year)	9.0 (tons)	10 (pounds per year)	10 (pounds)	190 (tons/year)	190 (tons)
Calcine Solids Transport Lines	Landfill	1	9.0 (tons/year)	9.0 (tons)	10 (pounds per year)	10 (pounds)	190 (tons/year)	190 (tons)
Total			36 (tons/year)	36 (tons)	40 (pounds per year)	40 (pounds)	750 (tons/year)	750 (tons)
New Waste Calcining Facility^g								
New Waste Calcining Facility	Perf.-Based or Landfill	3	50 (tons/year)	150 (tons)	56 (pounds per year)	170 (pounds)	1,000 (tons/year)	3,100 (tons)
Remote Analytical Laboratory								
Remote Analytical Laboratory (CPP-684)	Perf.-Based	6	33 (tons/year)	200 (tons)	37 (pounds per year)	220 (pounds)	680 (tons/year)	4,100 (tons)

- a. Annual emissions represent the highest emission rate for any single year and is the sum of annual emission rates for each activity within a group that may occur during a common year; cumulative emissions are the annual rate multiplied by duration in years. Facility group totals are the sums of individual projects within that group. Annual emission rate totals are for projects that would occur over the same general time frame. All values are rounded to two significant figures. Source: Project Data Sheets (Appendix C.6).
- a. See Table 3-22 for facility disposition alternatives that apply to each group. The Fuel Processing Building and Related Facilities and the New Waste Calcining Facility could be dispositioned by either performance-based closure or closure to landfill standards. Individual facilities within all other groups would be dispositioned according to a single closure method.
- b. Duration refers to total number of calendar years during which dispositioning of facilities within the listed groups would occur.
- c. The specific pollutants and approximate relative percentages are as follows: carbon monoxide - 45 percent; sulfur dioxide - 7 percent; nitrogen dioxide - 38 percent; particulate matter - 2 percent; and volatile organic compounds - 8 percent.
- d. Carbon dioxide is listed because this gas has been implicated in global warming.
- e. Project includes deactivation and demolition of the Fluorinel Dissolution Process and Fuel Storage (FAST) building (CPP-666) and the associated stack (CPP-767). The FAST building would be closed according to performance-based closure criteria and the stack by clean closure. Emissions listed are totals from closure of both facilities.
- f. The decontamination and decommissioning of this facility is also included in some of the high-level waste processing alternatives present in Table 5.3.4-1.

Table C.2-33. Maximum criteria pollutant impacts from dispositioning of other existing INTEC facilities associated with HLW management.

Pollutant	Averaging time	Impact of alternative (micrograms per cubic meter)			Cumulative impact (micrograms per cubic meter) ^a			Percent of standard ^b		
		Site boundary	Public roads	Craters of the Moon	Site boundary	Public roads	Craters of the Moon	Site boundary	Public roads	Craters of the Moon
Tank Farm Related Facilities										
Carbon monoxide	1-hour	59	170	14	270	590	26	<1	1	<1
	8-hour	24	62	2.4	100	130	6.6	1	1	<1
Nitrogen dioxide	Annual	0.058	0.22	5.3×10 ⁻³	0.52	1.4	0.060	<1	1	<1
Sulfur dioxide	3-hour	6.1	14	1.0	30	53	4.8	2	4	<1
	24-hour	1.3	3.4	0.13	6.6	13	1.4	2	4	<1
	Annual	0.010	0.040	1.0×10 ⁻³	0.15	0.49	0.017	<1	1	<1
Respirable particulates ^c	24-hour	0.50	1.2	0.050	12	26	1.0	8	17	<1
	Annual	0.038	0.015	3.5×10 ⁻⁴	0.49	1.8	0.040	<1	4	<1
Lead	Quarterly	8.2×10 ⁻⁷	2.7×10 ⁻⁶	7.8×10 ⁻⁸	2.3×10 ⁻⁴	5.0×10 ⁻⁴	5.5×10 ⁻⁵	<1	<1	<1
Bin Set Related Facilities										
Carbon monoxide	1-hour	410	1.2×10 ³	96	620	1.6×10 ³	108	2	4	<1
	8-hour	170	430	17	240	498	21	2	5	<1
Nitrogen dioxide	Annual	0.40	1.5	0.037	0.86	2.8	0.09	<1	3	<1
Sulfur dioxide	3-hour	42	100	6.9	66	140	11	5	11	<1
	24-hour	8.9	23	0.88	14	33	2.1	4	9	<1
	Annual	0.073	0.28	6.6×10 ⁻³	0.21	0.73	0.02	<1	1	<1
Respirable particulates ^c	24-hour	3.3	8.5	0.32	15	33	1.3	10	22	<1
	Annual	0.027	0.10	2.4×10 ⁻³	0.52	1.9	0.050	1	4	<1
Lead	Quarterly	5.6×10 ⁻⁶	1.8×10 ⁻⁵	5.4×10 ⁻⁷	2.4×10 ⁻⁴	5.1×10 ⁻⁴	5.6×10 ⁻⁵	<1	<1	<1
Process Equipment Waste Evaporator and Related Facilities										
Carbon monoxide	1-hour	380	1.1×10 ³	90	590	1.5×10 ³	100	1	4	<1
	8-hour	150	400	16	230	470	20	2	5	<1
Nitrogen dioxide	Annual	0.38	1.4	0.030	0.84	2.7	0.090	<1	3	<1
Sulfur dioxide	3-hour	40	93	6.4	63	130	10	5	10	<1
	24-hour	8.3	22	0.82	14	32	2.1	4	9	<1
	Annual	0.070	0.26	6.0×10 ⁻³	0.21	0.71	0.020	<1	<1	<1
Respirable particulates ^c	24-hour	3.1	8.0	0.30	15	32	1.3	10	22	<1
	Annual	0.020	0.10	2.0×10 ⁻³	0.51	1.8	0.050	1	4	<1
Lead	Quarterly	5.3×10 ⁻⁶	1.7×10 ⁻⁵	5.0×10 ⁻⁷	2.4×10 ⁻⁴	5.1×10 ⁻⁴	5.6×10 ⁻⁵	<1	<1	<1
Fuel Processing Building and Related Facilities										
Carbon monoxide	1-hour	140	390	32	340	810	44	<1	2	<1
	8-hour	55	140	5.6	130	210	10	1	2	<1
Nitrogen dioxide	Annual	0.13	0.52	0.01	0.59	1.7	0.070	<1	2	<1
Sulfur dioxide	3-hour	14	33	2.3	38	72	6.1	3	6	<1
	24-hour	3.0	7.8	0.29	8.3	18	1.5	2	5	<1
	Annual	0.020	0.090	2.0×10 ⁻³	0.17	0.55	0.020	<1	<1	<1
Respirable particulates ^c	24-hour	1.1	2.8	0.11	13	27	1.1	9	18	<1
	Annual	9.0×10 ⁻³	0.030	8.1×10 ⁻⁴	0.50	1.8	0.040	<1	4	<1
Lead	Quarterly	1.9×10 ⁻⁶	6.1×10 ⁻⁶	1.8×10 ⁻⁷	2.3×10 ⁻⁴	5.0×10 ⁻⁴	5.5×10 ⁻⁵	<1	<1	<1
FAST and Related Facilities										
Carbon monoxide	1-hour	46	130	11	250	550	23	<1	1	<1
	8-hour	18	48	1.9	97	110	6.1	<1	1	<1

Table C.2-33. (continued).

Pollutant	Averaging time	Impact of alternative (micrograms per cubic meter)			Cumulative impact (micrograms per cubic meter) ^a			Percent of standard ^b		
		Site boundary	Public roads	Craters of the Moon	Site boundary	Public roads	Craters of the Moon	Site boundary	Public roads	Craters of the Moon
FAST and Related Facilities (continued)										
Nitrogen dioxide	Annual	0.040	0.17	4.0×10^{-3}	0.5	1.4	0.060	<1	1	<1
Sulfur dioxide	3-hour	4.7	11	0.76	28	50	4.6	2	4	<1
	24-hour	1.0	2.6	0.10	6.3	12	1.3	2	3	<1
	Annual	8.0×10^{-3}	0.030	7.3×10^{-4}	0.15	0.49	0.02	<1	<1	<1
Respirable particulates ^c	24-hour	0.36	0.95	0.04	12	25	1.0	8	17	<1
	Annual	3.0×10^{-3}	0.010	2.7×10^{-4}	0.49	1.8	0.040	<1	4	<1
Lead	Quarterly	6.3×10^{-7}	2.0×10^{-6}	6.0×10^{-8}	2.3×10^{-4}	5.0×10^{-4}	5.5×10^{-5}	<1	<1	<1
Transport Line Group										
Carbon monoxide	1-hour	33	93	7.7	240	510	20	<1	1	<1
	8-hour	13	35	1.3	91	100	5.5	<1	1	<1
Nitrogen dioxide	Annual	0.030	0.12	3.0×10^{-3}	0.49	1.3	0.060	<1	1	<1
Sulfur dioxide	3-hour	3.4	8.0	0.55	27	47	4.4	2	4	<1
	24-hour	0.72	1.9	0.07	6.0	12	1.3	2	3	<1
	Annual	6.0×10^{-3}	0.020	5.3×10^{-4}	0.15	0.48	0.02	<1	<1	<1
Respirable particulates ^c	24-hour	0.26	0.68	0.030	12	25	1.0	8	17	<1
	Annual	2.0×10^{-3}	8.0×10^{-3}	1.9×10^{-4}	0.49	1.8	0.040	<1	4	<1
Lead	Quarterly	4.5×10^{-7}	1.5×10^{-6}	4.3×10^{-8}	2.3×10^{-4}	5.0×10^{-4}	5.5×10^{-5}	<1	<1	<1
New Waste Calcining Facility										
Carbon monoxide	1-hour	46	130	11	250	550	23	<1	1	<1
	8-hour	18	48	1.9	97	114	6.1	<1	1	<1
Nitrogen dioxide	Annual	0.045	0.17	4.0×10^{-3}	0.50	1.4	0.060	<1	1	<1
Sulfur dioxide	3-hour	4.7	11	0.76	28	50	4.6	2	4	<1
	24-hour	1.0	2.6	0.10	6.3	12	1.3	2	3	<1
	Annual	8.0×10^{-3}	0.030	7.3×10^{-4}	0.15	0.49	0.017	<1	<1	<1
Respirable particulates ^c	24-hour	0.36	0.95	0.036	12	25	1.0	8	17	<1
	Annual	3.0×10^{-3}	0.011	2.7×10^{-4}	0.49	1.8	0.043	<1	4	<1
Lead	Quarterly	6.3×10^{-7}	2.0×10^{-6}	6.0×10^{-8}	2.3×10^{-4}	5.0×10^{-4}	5.5×10^{-5}	<1	<1	<1
Remote Analytical Laboratory										
Carbon monoxide	1-hour	30	85	7.1	240	500	19	<1	1	<1
	8-hour	12	32	1.2	90	97	5.4	<1	<1	<1
Nitrogen dioxide	Annual	0.030	0.11	3.0×10^{-3}	0.49	1.3	0.060	<1	1	<1
Sulfur dioxide	3-hour	3.1	7.3	0.50	27	46	4.3	2	4	<1
	24-hour	0.7	1.7	0.060	6.0	12	1.3	2	3	<1
	Annual	5.0×10^{-3}	0.02	4.8×10^{-4}	0.15	0.47	0.020	<1	<1	<1
Respirable particulates ^c	24-hour	0.24	0.60	0.020	12	25	1.0	8	17	<1
	Annual	2.0×10^{-3}	7.0×10^{-3}	1.8×10^{-4}	0.49	1.8	0.040	<1	4	<1
Lead	Quarterly	4.1×10^{-7}	1.4×10^{-6}	3.9×10^{-8}	2.3×10^{-4}	5.0×10^{-4}	5.5×10^{-5}	<1	<1	<1

a. Cumulative impacts conservatively assume that the highest concentration for the alternative and the highest baseline concentration occur at the same location and (for concentrations other than annual averages) over the same time period.

b. Cumulative impacts are compared to the applicable standards provided in Table C.2-15. All standards except that for 3-hour sulfur dioxide are primary standards designed to protect public health. The 3-hour sulfur dioxide standard is a secondary standard designed to protect public welfare. (There is no primary standard for 3-hour sulfur dioxide.)

c. Values do not include contributions of fugitive dust.

Table C.2-34. Summary of maximum toxic air pollutant concentrations at onsite and offsite locations from dispositioning of other existing INTEC facilities associated with HLW management.

Receptor	Highest percentage of applicable standard ^{a,b}							
	Tank Farm Related Facilities	Bin Set Related Facilities	PEW Evaporator and Related Facilities	Fuel Processing Building and Related Facilities	FAST and Related Facilities	Transport Lines Group	New Waste Calcining Facility	Remote Analytical Laboratory
Carcinogens^c								
INEEL boundary areas	0.29	2.0	0.29	0.66	0.22	0.16	0.22	0.14
Craters of the Moon	0.026	0.18	0.026	0.060	0.020	0.014	0.020	0.013
INEEL facility area location ^d	2.8	20	2.8	6.6	2.2	1.6	2.2	1.4
Noncarcinogens^c								
INEEL boundary areas	0.22	0.15	0.14	0.051	0.017	0.012	0.017	0.010
Craters of the Moon	2.2×10^{-3}	0.015	0.014	5.0×10^{-3}	2.0×10^{-3}	1.0×10^{-3}	0.002	1.0×10^{-3}
Public road locations	0.058	0.40	0.37	0.13	0.045	0.032	0.045	0.029
INEEL facility area location ^d	2.8	15	14	4.9	1.6	1.2	1.6	1.1

- a. Applicable ambient air standards are specified in IDHW (1997) for carcinogenic air pollutants and noncarcinogenic toxic air pollutant increments. It should be noted that these standards apply only to new sources; they are used here as reference values for purposes of comparison.
- b. Applicable standard for onsite levels is the 8-hour occupational exposure limit established by either the American Conference of Government Industrial Hygienists or the Occupational Safety and Health Administration; the lower of the two is used.
- c. In all cases, the highest carcinogenic and noncarcinogenic impacts are due to nickel and vanadium, respectively.
- d. Location of highest onsite impacts is within INTEC.